

DEPARTMENT OF MECHANICAL ENGINEERING

Name of SOP	T1 Oil Engine
Effective Date	Dec 21, 2005 Rev. January 21, 2008
Author	Joe Verhaeghe
Reason for SOP	Risk of loss of fingers Risk of severe burn Risk of Diesel fume inhalation Risk of Diesel fuel spill
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 EOHSS - Environmental Occupational Health & Safety Service

Requirements

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

Description of the Task

Location and time of work	JHE 106A, during scheduled undergraduate labs
Individuals and skills required	Graduate Students,
Equipment and supplies required	<ol style="list-style-type: none"> 1. Diesel Engine apparatus on dolly 2. Diesel Fuel 3. Sotcher Generator Test Set Model 627 4. data acquisition computer
Personal protective equipment required	None

Sequential steps to complete the work safely.

CAUTION

Do not touch engine when it is hot. Diesel engine apparatus can be very hot and cause severe burns.

Ensure engine is completely stopped before entering the engine room.

There are several pinch points on the equipment, which can cause severe injury.

Pre start checks

1. Ensure oil level is adequate
2. Ensure coolant level in Radiator overflow tank is adequate
3. Ensure the fuel tank is at least 50% full.
4. Ensure 240VAC generator on the diesel engine dolly is plugged in.
5. Ensure VGA cable from the diesel engine dolly is connected to the extension cable.
6. Ensure USB cable from the diesel engine dolly is connected to the extension cable.
7. Ensure Boss cable from the diesel engine dolly is connected to the extension cable.
8. Ensure exhaust pipe is located correctly under the fixed exhausted pipe.
9. Ensure "EX. Fan.11.panel" is on. Panel is located in hallway in front of JHE106.
10. Press RED start push button, to the left of EX. Fan.11.panel and ensure red light on EX. Fan.11.panel lights.
11. Ensure both doors to the engine room are closed.
12. Start Diesel Lab view program on the computer.
13. Remove offset weight from fuel scale and press ">0<" key on Ohaus CD-33 scale display.
14. Replace offset weight on scale. Scale should read 3 Kg or higher.
15. Plug in the Generator Test Set fan to 120VAC outlet.
16. Plug in Generator Test Set 240VAC cable . (Large cable)

Engine Start up

1. Pull out red emergency stop switch on Boss I-G control
2. Pull throttle out about 3 cm. Press red button while pushing or pulling throttle.
3. If engine is cold, turn key CCW and hold for 1 minute. (Activates glow plug)
4. Turn key CW 2 positions to crank engine and hold for 30 second or until engine sounds it started.
5. Release key. Leave in on position.
6. Adjust throttle by turning the control knob at red button or by pressing the red button and pushing or pulling the throttle.

Engine Shut down

1. Turn off all load switches on Generator Test Set
2. Reduce engine speed to idle.
3. Turn key to off position.
4. Unplug 120VAC fan from Generator Test Set.

Changing Load and Recording data.

1. Adjust engine speed to 3600RPM using the computer speed display. Alternatively 60 Hz on the frequency meter of Generator Test Set corresponds 3600RPM.
2. Switch on load switch as required (5A, 10A or 15A)
3. Adjust engine speed if required.
4. Press the "Tare Fuel Scale" button on the computer to reset the timer and fuel weight scale.
5. Allow the engine to warm-up for 5 minutes.
6. Press Acquire and Analysis button on computer to read the PV diagram.
7. Press "Save Data to File" button to store current data.
8. Repeat steps 5-10 for all required loads.

Contingency Plan and Reporting

Accident / injury response <ol style="list-style-type: none">1. Apply first aid as required2. Notify Mechanical Engineering technical staff immediately3. For all injuries complete a "Injury/Incident Report" and provide a copy to the Chair and EOHSS4. In case of critical injury call security (dial 88).5. In case of critical injury notify EOHSS immediately, ext 24352
Spill response <ol style="list-style-type: none">1. Place absorbent socks across doorway to contain the spill to the engine room.2. Notify technical staff, JHE205 X24791, for complete cleanup instructions.
Equipment shutdowns. Emergency Stop. The engine may be stopped quickly in two ways. <ol style="list-style-type: none">1. Press large red Emergency stop on Boss I-G controller.2. Open door to engine room which will break the interlock circuit.

Environmental Responsibility

Waste disposal procedures No waste is produced during normal operation except for the exhaust gas, which is vented to the outside through the exhaust fan. Engine fluids are replaced on a regular maintenance schedule.
Building air quality All exhaust fumes exit the building via roof fan "EX. Fan.11.panel". If smells are noticed while running the engine, notify the technical staff in JHE205 Ext 24791.

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

<ol style="list-style-type: none">1. RMM Policy #300 Safety Orientation and Training Program2. RMM Policy #301 Standard Operating Procedure3. RMM Policy #309 Laboratory Safety Manual4. RMM Policy #403 Noise Control and Hearing Preservation5. RMM Policy #506 Hazardous Waste Management6. RMM Policy #1000 Reporting and Investigating Injury, Incidents and Occupational Disease

Distribution

<ol style="list-style-type: none">1. Supervisor2. Trained teaching assistant who is the lab operator3. Technical Staff of Mechanical Engineering4. Faculty of Engineering JHSC

Risk Management Manual (RMM)

<http://www.workingatmcmaster.ca/link.php?link=Job+Matters%3APolicy-Manual>

Environmental and Occupational Health Support Services

<http://www.workingatmcmaster.ca/link.php?link=Job%20Matters:EOHSS>