



presentation



Introduction

- Mobile machine proper shutdown, lockout and zero-energy state
- Parking and shutdown – safe work practices
- Lockout and tag – safe work practices
- Zero-energy state – potential and kinetic energy

Know your machine

- Unique systems
- Same model – different year may have different requirements
- Manufacturer's manuals

Lockout

- Park on level ground
- Lower all implements or block
- Idle down to cool
- Apply parking brake
- Transmission and hydraulic controls in park position, turn ignition and master switches off and remove key(s) to make sure controls are inoperable
- Lockout tag and lock on master switch
- All energy, including kinetic and potential, has been dealt with
- Pins, chains or lift pistons, screens or guards are engaged

Types of energy

- There are two main types of energy in mobile equipment:
- kinetic
 - motion
- potential
 - stored in raised weight, pneumatic or hydraulic systems

Potential energy

- Potential energy is stored energy
- Potential energy is stored in objects by the application of a force (examples: pressurized gas or hydraulic fluid)
- Lower all implements, attach all restraining pins, bars, block raised implements, wait for motion to stop
- Wear appropriate personal protective equipment

Hydraulic energy

- Follow manufacturer's procedures for de-energizing or isolating energy (check operator and service manuals)
- Never by-pass hydraulic components
- Wear all required PPE, including eye protection, when working on hydraulic systems
- Never test for leaks with your hand (even gloved hand). Use a piece of cardboard or metal.

Kinetic energy

- Kinetic energy is motion energy – of waves, electrons, atoms, molecules, substances, and objects
- The two main types of kinetic energy in mobile equipment are:
 - Electrical
 - Thermal (heat)

Electrical energy

- Electrical systems are complex and hazardous
- Cables, wiring, relay boxes and connectors can have electrical energy
- Turn off master switch and lockout
- Follow the manufacturer's recommendations

Thermal energy

- Sources – exhaust, coolant, brakes, engine
- Shutdown – idle until temperature falls to normal operating level
- Wear PPE when near hot surfaces
- Always remove combustible debris from hot surface areas

Start-up

- Only the authorized person is to reverse lockout
- Ensure there are no others in danger zone

Meeting wrap-up

- Be sure to follow proper shutdown, lockout and zero-energy state procedures for each machine
- Know your machine
- Lockout procedures create a zero-energy state – dealing with potential and kinetic energy
- Be aware of hydraulic, electrical, thermal energy when shutting down and lockout out a machine