Kennecott Utah Copper

Standard Work Instruction

Komatsu 930 Haul Truck Isolation for Maintenance

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Site name:	RTKC Mine	Department:	Mobile Maintenance

Job description

This instruction details the steps to be taken by maintenance personnel to render the starting system of a Komatsu 930 haul truck inoperable. It also details the steps required to remove the stored hydraulic energy from the brake and steering accumulators. This procedure must be completed by maintenance personnel prior to performing any repairs on the truck. This instruction is intended to supplement MNSOP160-0036 and give further detail applicable specifically to maintenance personnel.

No.	Work Step
1	Stage Truck in Preparation for Isolation
2	Isolate and De-Energize
3	Apply Locks and Tags
4	Perform Maintenance or Repair Task(s)
5	Remove Locks and Tags, Return Truck to Service
6	Diagnostic Isolation Mode Procedure

Note: A separate procedure (MNSOP-00340-0013) also applies when isolating trucks positioned over floor hoists (Copperfield Shop Bays 11, 12, 15, and 16)

Prep - work

Parts & Materials Required

- Lockout Hasp(s)
- Isolation Officer's lock and tag
- Personal lock(s) and tag(s)

PPE Required

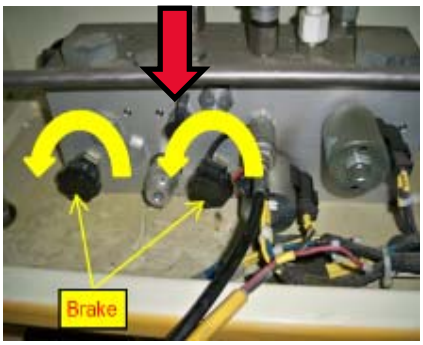
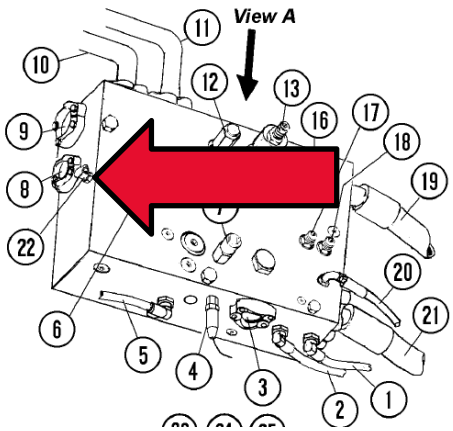
- Standard Shop PPE

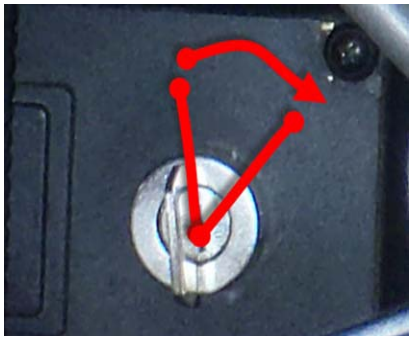
HSE hazards

All HSE hazards are analysed in a risk assessment, and the operational controls are identified in the appropriate work step.

Kennecott Risk Analysis Tool (KRAT):	5640

Step	Work Steps	Visuals
1	**Stage Truck in Preparation for Isolation** **(For Diagnostic Isolation Process Skip to Step 6)**	
1.1	Inspect the work area Ensure that the truck is positioned properly for the work to be done. Verify that the truck is not running. Make sure there isn't anybody on the truck or in the cab and confirm that wheel chocks are in the proper places against the tire Note: The bed must either be cabled in the raised position, blocked in a partially raised positon, or resting fully against the frame of the truck to remove the stored energy in the hoist circuit.	
2	**Isolate and De-Energize**	
2.1	Actuate the starter isolation switch For 930E-4SE trucks the switch is on the left side of the battery box on the front bumper of the truck For 930E-3SE trucks the switch is on the electrical box on the left front boarding platform Apply Isolation Officer's lock and tag. The Isolation Officer will now install a lockout hasp, green isolation lock, green isolation tag and personal ID tag to the lockout switch to prevent the switch from being actuated. Note: There is an LED light near the lockout switches that, when illuminated, indicates there is no voltage available to the starters. **This LED is NOT to be used by maintenance personnel as a substitute for the in cab (key switch) try step and hydraulic energy checks as it does not indicate the presence of zero energy in the accumulators.** The light is only considered a suitable try step for operations personnel performing equipment inspections as they will not be exposed to the same level of hazard that maintenance personnel are exposed to during maintenance or repair activities.	 

Step	Work Steps	Visuals
2.2	Check that the high voltage system is de-energized Verify that the LED light on the high voltage cabinet is NOT illuminated. The LED is illuminated when 50 or more volts are present in the high voltage system. There are 2 of these status LEDs. The first is on the outside of the high voltage cabinet on the right side of the truck, the second is inside the control power cabinet. Note: If any of the high voltage cabinets need to be opened additional steps are required to confirm that no stored electrical energy is present. Refer to step 2 in SAP document # 09017d818048714b	
2.3	Bleed the hydraulic oil from the brake accumulators Open both of the brake accumulator bleed down valves on the brake manifold in the brake cabinet behind the cab to bleed the pressurized oil from the brake accumulators To verify brake pressure is at 0 psig install a gauge on the LAP1 test port. (Shown by red arrow in image to the right.)	
2.4	Confirm that the steering accumulators are bled down. Verify that all personnel are clear of the truck and attempt to turn the steering wheel. If pressurized oil is stored in the steer accumulators the wheels will still be able to turn. If the wheels can turn, slowly rock the steering wheel back and forth until the steering stops functioning. To verify steering pressure is at 0 psig install a gauge on the TP3 port on the bleed down manifold. (Item 22 in bottom right image) Note: the steer accumulators are setup to automatically bleed down when key switch power is lost and engine RPM drops to zero. Do not disconnect battery power during automatic bleed down. If battery power is lost, bleed down will be interrupted and the remaining pressure will still be in the circuit. If the steer accumulators fail to bleed down automatically there is either a fault in the bleed down circuit or the truck was shut off using one of the emergency shutdown switches instead of the key switch.	 

Step	Work Steps	Visuals
2.5	Try to start the truck using the key switch. Hold the key switch in the start position for at least 10 seconds to confirm the truck will not start. Listen for the pre-lube motor as it should also not be able to be energized.	
3	**Apply Personal Locks and Tags**	
3.1	Once having received permission from the isolation officer, all personnel who will be working within the controlled work area of the truck will now install their personal lock and ID tag on the hasp. If the isolation officer will also be within the controlled area of the truck, he/she must also place their personal lock and ID tag on the hasp. Additional hasps may be installed in a chain and used to accommodate additional locks as needed.	
4	**Perform Maintenance or Repair Task(s)**	
5	**Remove Locks and Tags, Return Truck to Service**	
5.1	All Personal tags must be removed and the area must be confirmed clear before the isolation officer may remove the isolation officer's lock, tag and hasp. Note: Personal locks and tags may only be removed by the owner as named on the tag. Actuate the starter lockout switch to return power to the starter circuit and return the truck to operational status.	

Step	Work Steps	Visuals
6	**Diagnostic Isolation Mode Procedure** Diagnostic isolation mode is only to be used by properly trained maintenance personnel. Diagnostic isolation mode must only be used when it is absolutely necessary. If there is any way to perform the desired task with the equipment fully isolated then diagnostic mode must not be used. The only exception to this is where, through a formal risk assessment, it has been determined that it would be less hazardous overall to perform the task in diagnostic mode.	
6.1	Check that the truck is not running, the cab is empty, and wheel chocks are in place.	
6.2	Apply Isolation Officer's lock and diagnostic tag to a hasp on the lockout switch in the "run" position	
6.3	All personnel to be involved in the task, including the isolation officer if applicable, must place their personal locks and tags on the hasp(s) Remember: The truck is "live" and has the potential for exposure to multiple types of hazardous energy. The truck can be started at any time. Minimize personnel allowed on the truck and minimize time spent in diagnostic mode to the time it takes to complete only the steps where the truck must be running. Switch the truck to full isolation as soon as possible by following this instruction from the beginning.	

Responsibilities

Role	Responsibilities
Craftsman	Follow this work instruction and inform leader of improvements or inability to perform work.
Supervisor/Leader	Create the work standard and teach it to craftsmen. Ensure that craftsmen follow the work standard. Take action when craftsmen ask for help and suggest improvements. Revise the work standard.
Superintendent	Confirm that line leaders are implementing standard work.

Reference material

Document reference	Document title
MNSOP160-0036	LOTO 930E Komatsu

Revision history

MOC #	Description of change	Prepared by	Date
43877	Creation of 930 LOTO SWI for Maintenance Personnel Next Review Due 12/2022	Mike Lancaster	12-6-2017