

OPERATE A DIRECT CURRENT WINDER

NQF Level: 3

Credits: 15

SAQA Unit Standard: 256603

Introduction

The importance to operate a direct current winder is to provide transport for persons, material up and down the shaft and conveying minerals to surface. Persons and material are normally conveyed in cages and minerals are hoisted with skips. There are operating differences between direct current winders and the mines specific requirements will be applicable for every winder.

The different types of direct current winders are: -

- a) Ward Leonard winders
- b) Thyristor winders

Every person in the working environment has a responsibility towards personal safety and the safety of others. A person competently operating a direct current winder contributes effectively towards his/her own safety and the safety of others in terms of providing winding operations and thereby transportation for persons to and from the underground workings and conveying minerals to surface.

You must also be alert to potential consequences of incorrect working standards and must strictly adhere to legislation and all laid down site specific requirements that will ensure your own safety and the safety of others, as well as the operation of equipment to comply with required safety standards.

Incorrect operating methods are hazardous and may lead to accidents and may cause injuries to persons or damage equipment.

When starting the Motor Generator (MG) set, this short-circuiting switch must be in the “start” position. This places the brushes on the slip rings. When the set is running at full speed the short-circuiting switch is moved to the “run” position. This short circuits the rotor circuit and also lifts the brushes from the slip rings. This prevents undue wear on brushes and slip rings during normal operation. Not all winders are fitted with a brush-lifting device on the Motor Generator (MG) set.

Both the external rotor resistance and the short-circuiting gear are fitted with small interlocking switches which are electrically connected to the no-volt circuit of the main circuit breaker. These limit switches ensure that both devices are in the “start position” before the circuit breaker can be switched in.

Note:

Starting the Motor Generator (MG) set with the rotor resistance cut out, or the short-circuiting switch in the “run” position, will result in very high current flowing in the stator and the rotor, which in turn will result in damage as well as personal injury.

Winders are equipped with a device to reduce the generator field current gradually when a trip-out occurs in mid-shaft, which will cause electrical braking to retard the winder during the mechanical brake application thus bringing the winder to a standstill.

This does not apply if the Motor Generator (MG) set circuit breaker or loop breaker trips the safety circuit. The safety circuit always includes a contact on the Field Failure Relay. Should the winder motor field fail or weaken appreciably during operation, it would cause a damaging current surge and the motor would try to speed up dangerously. The relay would detect such field failure and trip the safety circuit.

Direct current winder

Apply sufficient current in the required direction to control the winder movement.

Ease off the main brake lever and manipulate the control lever to control the speed.

Check the ammeter, depth indicator and the rope speed indicator.

Manipulate the control lever to reduce the speed when approaching the signal destination.

Reduce the winder speed to stop at the signaled destination.

Apply the main brake lever and verify the required indicators for the correct positioning.
Move the control lever into neutral and check that the winder remains stationary.

Control lever stuck in the open position.

Stop the winder by tripping the emergency trip switch to obtain the benefit of slow braking.

Secure the winder.

Make an entry in the driver logbook, state the time and sign the entry.

Report to a person in authority.

Request the assistance of a fitter and or electrician to rectify the fault.

After repairs run one complete trial trip to test the control lever operation.

Counter-sign the logbook entry when it has been cleared by the engineer and artisans.

Brakes fail to come on: -

Do not trip the safety circuit when the brakes fail to come on.

Manipulate the control lever and move the conveyances to the point of balance or mid-wind position in the shaft.

Release the main brake lever to prevent a trip-out on no-start or brake rubbing.

Apply the main and side brake levers at the point of balance or mid-wind positions “*when the brakes do not come on*”.

Release all brakes and move the winder slowly up and down in the mid shaft position.

Request persons in authority for assistance.

Test both brakes separately after the brakes have been cleaned, adjusted or repaired.

Return the conveyances to the original signal destination,

When required permit persons to leave the conveyance, using the respective signalling system.

Request the clear signals when required.

Test both brakes separately for brake holding power.

Run one complete trial trip.

Test both brakes separately and if satisfactory,

On completion countersign the driver logbook entry made by the engineer and fitter.

Brake slipping –

Secure the winder main brake on and control lever in the neutral position.

Move the respective side brake lever to the brake off position.

Apply power to move the conveyances to the point of balance, or for a single drum winder to surface.

Apply the main brake lever and the side brake levers to the “brake on position”.

Make an entry in the driver logbook, state the time and sign the entry.

Notify a person in authority for assistance.

The fitter will clean and/or adjust the brake.

Test the brake and if the holding power is satisfactory.

Run one complete trial trip.

Test the brake again as described above and if satisfactory,

Countersign the entry made by the engineer and fitter in the driver log book.

Long reach rod breaks: -

Transmit the signal 2 pause 2 pause 2 (*persons must leave the conveyance*), or when required request the clear signal on the respective signalling systems.

Receive a clear signal.

Move the conveyance to the point of balance in the shaft.

Apply the side brake lever which is still operative (*Opposite side*).

Move the control lever to the neutral position.

Keep the main brake lever in the off position to prevent further damage to faulty brake equipment.

Report to a person in authority and request an artisan’s assistance.

The artisan must make an entry in the driver log book, enter the time, sign and the driver must countersign.

When the broken long reach rod has been replaced;

Assist the fitter with the re-adjusting of the brake. (*Verifies the brake indicator*).

Test both brakes separately after the defective reach-rod has been replaced and the required adjustment on respective brake is completed.

Run a complete trail trip.

Test both brakes separately and if the holding power is satisfactory.

Countersign the driver logbook entry made by the person in authority and artisan.

Bad coiling

Stop and secure the winder, brakes on, control lever in neutral and apply the side brake levers.
Make an entry in the driver logbook and state position of the conveyance in the shaft.
Notify a person in authority and request artisan's assistance.

The artisan must make an entry in the driver logbook, enter the time, sign and the driver must countersign.
Follow the required site specific requirements to rectify the bad coiling.
Return the conveyance to the signalled destination (if required).
Obtain a clear signal 2 pause 2 from the banksman and onsetter respectively.
Run a complete trial trip to test the rope coiling.
Counter-sign the entry in the driver logbook made by the person in authority and artisan.

Trial run of winding plant

When winding in any compartment or compartments of a shaft, winze or headgear has been stopped for repairs or blasting operations or when it has been stopped for any other purpose for a period exceeding one hour in duration or when a conveyance has been changed, the winding engine serving such compartment or compartments shall not be used for the raising or lowering of persons until the cage, skip or other means of conveyance has been run at least one complete trip up and down such compartment or compartments.