POSITION CONVEYANCES IN A SHAFT BY MEANS OF CLUTCHING

NQF Level: 3
Credits: 11
SAQA Unit Standard number: 256600

Introduction
The importance to position conveyances in a shaft by means of clutching is to save time in providing 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 and controlling differences between clutching an alternating current and direct current winders applicable to the mines specific requirements applicable for the different winders.

The different clutches on winders are: -

a) The tooth clutches
b) The multiple-tooth clutches
c) Jaw clutches

Every person in the working environment has a responsibility towards personal safety and the safety of others. A person competently positing shaft conveyances by means of clutching contributes effectively towards the safety of persons in terms of providing correct winding operations to and from the underground workings.

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.

Clutching the shaft conveyances for the bank and the different working levels on busy shafts is a time saving operation and applicable to all winders except Koepé and single drum winders. Incorrect clutching methods are hazardous and may lead to accidents and may cause injuries to persons or damage equipment.

BRAKE TEST
The driver must: -
Apply the side brake lever of the drum that produces the maximum static torque on the brake to the *Brake on clutch in position*
Ease the main brake lever to the off position.
Check the drum remains stationary.
Move the control lever in the direction to drive the conveyance down that produce the most static torque on the drum.
Check that the drum remains stationary.
Increase power to the maximum and check the ammeter to prevent a trip-out on over load of current.
Check that the drums remain stationary, an indication of sufficient brake holding power.
Move the control lever slowly back to neutral to lower the backlash accidentally being picked up when testing the brake.
Apply the main brake lever.
Move the side brake lever to the brake off clutch in position. (*No 1 position*)
Apply the side brake lever on the opposite drum (*Brake on clutch in position*) No 2 position.
Ease off the main brake lever.
Check that the drum remains stationary.
Increase power to the maximum to "drive the bottom conveyance down" and check the ammeter to prevent a trip-out on over load of current.
Check that the drum remains stationary, indication of sufficient brake holding power.
Move the control lever slowly back to neutral.
Apply the main brake lever.

Any movement on the winder drum during any brake test will be a positive indication of the brake slipping, avoid clutching the winder if the brake holding power is insufficient. The winder must be properly secured and corrective actions taken.

For the purpose of un-clutching a drum the side brake lever must be moved to the No 3 position (*Brake on clutch out position*) to withdraw the male part of the clutch from the female part which is secured to the side of the winding drum.
Although *the legal* requirement state that the brake on the drum to be un-clutched must be tested, it becomes essential that both brakes must be tested separately for sufficient brake holding power. This is to avoid dangerous movement of any one of the two drums during the clutching process or trip-outs due to power failure, faulty contactors or any other safety circuit devices tripping the winder. The brake test must be made against sufficient power but this is difficult to determine and brakes are normally tested to the maximum available power, namely up to the red line on the ammeter scale.

Clutching the winder in a vertical shaft
The procedures to un-clutch a winding drum is the same for AC or DC winders in a vertical or incline shafts. Assume that the conveyances have been used to pull rock and it is now intended to hoist persons from a lower level. The driver has to clutch the winder to convey persons.

The driver must: -
Receive a clutching signal, destination signal and a clear signal on the underground lock bell system.
Receive a clear signal on the bank lock bell system when required.
Position the top conveyance on the correct bank mark to transport persons.
Select the man/rock switch to the man position.
Test both brakes separately as described above and if brake holding power is satisfactory,
Apply power to pick-up the backlash on the drum to be un-clutched at the bank position
Apply the main brake lever.
Move the control lever back to neutral and
Withdraw the clutch by moving the side brake lever to the No 3 position (*Brake on clutch out position*)
Verify the clutch indicators that the clutch male part disengaged the female part. (*Mirrors, clutch indicators and pilot lights*).
Move the single drum at a reduced speed not exceeding 2. 5 m/sec. to protect the drum bushes on the un-clutched drum and
Stop by applying the main brake lever ½ a tooth above the mark at the signalled destination.
Check the brake engine indicator to assure the brake is fully applied and move the control lever to the neutral position.
Move the side brake lever to the No. 2 position (*brake on clutch in position*).
Apply sufficient power to control the single drum movement.
Ease off the main brake lever to engage the clutch male part into the female part.
Lower the clutch backlash. (*Check the mirrors, clutch indicators and pilot lights*)
Manipulate the levers to test both brakes separately as described above.
Check that the clutch is in and securely locked. (*The clutch and brake interlock*).
Run one complete trial trip when required
Return the conveyance to the onsetter destination and stop on the correct mark station mark.
Transmit the clutching completed signal to the onsetter on the underground lock bell system.
Interchange signals with the onsetter to prepare the conveyance for conveying persons.

Practical clutching
Position the top conveyance correctly.
Select the man/rock switch to the required position.
Apply the side brake lever of the drum that produces the maximum static torque on the brake to the No 2 position. (*Brake on clutch in position)*
Ease off the main brake lever.
Ensure the drum remains stationary.
Move the control lever in the direction to drive the conveyance down that produces the maximum static torque.
Ensure the drum remains stationary.
Increase power to the required amperage.
Ensure the drum remains stationary, (Indication for sufficient brake holding power).
Move the control lever slowly back to neutral to lower the backlash being picked up.
Apply the main brake lever.
Move the side brake lever to the “brake off clutch in position”. (*No 1 position*)
Apply the side brake lever on the opposite drum to the No 2 position. (*Brake on clutch in position*).
Ease off the main brake lever.
Ensure the drum remains stationary.

Move the control lever in the direction to drive the conveyance down that produces the maximum static torque.
Ensure the drum remains stationary.
Increase power to the required amperage.
Ensure the drum remains stationary, (Indication for sufficient brake holding power).
Move the control lever slowly back to neutral.
Apply the main brake lever.

The backlash of the drum about to be moved is picked up, in accordance with legal, site-specific and operational requirements.

Practical clutching
Apply the required amperage to pick-up the backlash on the drum to be un-clutched.
Apply the main brake lever.
Move the control lever back to neutral.

Disengagement of the clutch of the stationary drum
Withdraw the clutch by moving the side brake lever to the No 3 position (Brake on clutch out position).
Make sure that the clutch male part disengages from the female part. (Mirrors, clutch indicators and pilot lights).
Controlling of the clutched drum
Raise or lower the clutched drum at a reduced speed, not exceeding 2. 5 m/sec. to protect the drum bushes on the un-clutched drum.
Apply the main brake lever to stop the winder on the required position at the signalled destination**.**
Ensure the brake is fully applied and move the control lever to the neutral position.

Engagement of the clutch of the stationary drum
Move the side brake lever to the No. 2 position (brake on clutch in position).
Apply power to control the single drum movement during engaging the male part of the clutch.
Manipulate the levers of the winder to lower the backlash. (Check the mirrors clutch indicators and/or pilot lights)
Check that the clutch is in and securely locked. (The clutch and brake interlocks).
Testing of the brake holding power
Test both brakes separately as described above.
Run a complete trial trip when required.
Return the conveyance to the originator and stop on the correct position. Transmitting clutching complete signal
Transmit the clutching completed signal to the originator.
Trail run:
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: