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1.0 Persons Affected

This Standard Operating Procedure (SOP) affects all Transmission & Distribution Services employees and contractors who operate, or assist in the operation of, a Digger Derrick.

2.0 Purpose

This SOP provides the standard for digging a hole with a Digger Derrick.

The purpose of this procedure is:

- To establish a standard for digging a hole within the Transmission & Distribution Services
- To provide a detailed job process for employees and contractors who perform this procedure within the course of their job

3.0 Rationale

This SOP will support the safety of our personnel by ensuring safe working methods are consistently used for digging a hole with a Digger Derrick. This SOP will also ensure optimal use of equipment for the purpose of minimizing wear and tear.

This SOP requires that work performed by Transmission & Distribution Services employees and contractors satisfies all applicable policies and regulations.

4.0 Scope

In-the-Scope of the Procedure

- The procedure includes the following:
 - Set up Digger Derrick
 - Unstow the Auger
 - Dig the hole
 - Stow the auger
 - Post operational duties

Out-of-the-Scope of the Procedure

- The procedure does not include the following:
 - Digger Derrick - Set Wood Pole - De-Energized or New SOP
 - Digger Derrick - Set Wood Pole - Energized SOP
 - TRNSP Compliance - Secure Loads SOP

5.0 Policies and Regulatory Requirements

This SOP is a result of the following:

Policies:

- SaskPower Hazard Control Policy, 2008

Regulatory Requirement(s)

Saskatchewan Occupational Health and Safety Regulations, 1996

- Part XI: Powered Mobile Equipment
 - 155: Visual Inspection
 - 156: Inspection and Maintenance
 - 164: Dangerous Movements
- Part XIII: Hoists, Cranes and Lifting Devices
 - 199: Interpretation
 - 201(1): General Requirements
 - 204: Designated Operator
 - 210(1)(4): Designated Signaler
 - 212: Hoists, cranes with outriggers, etc.
 - 215: Logbook
 - 216: Inspections
- Part XVII: Excavations, Trenches, Tunnels and Excavated Shafts
 - 259: Locating underground pipelines, etc.
 - 260(6): Excavating and Trenching
- Part XXX: Additional Protection for Electrical Workers
 - 465(2): Proximity to exposed energized high voltage electrical conductors
- Table 22: Minimum distances from exposed energized high voltage electrical conductors

Other

American National Standard

- ANSI A10.31 - 2006

Manufacturer's Specifications

SaskPower Procedures

- SaskPower Bonding and Grounding Procedures
- SaskPower Limits of Approach
- SaskPower Standard Protection Code

SaskPower Safety Rulebook

SaskPower Standards

- Excavating and Trenching Standard

6.0 Roles, Responsibilities and Prerequisites

In-the-Scope of the Procedure Role(s)	Quantity Required	Responsibilities	Prerequisites
Digger Derrick Operator	1	1. Operate the equipment as per guidelines established in the following procedure.	1. An employee must be designated as a qualified Digger Derrick Operator, or to be under the supervision of a qualified Digger Derrick operator.
Digger Derrick Operator Assistant	1 or more	1. Assist the Digger Derrick Operator in Digging a Hole	1. Must be under the supervision of a qualified Digger Derrick Operator

7.0 Tools and Equipment

Tools and Equipment and Quantity Required:

- Digger Derrick
- Measuring Tape
- Shovel
- Ground lead (as required)
- Ground electrode (as required)
- Digger Derrick Operating Manual
- Construction Standards Manual
- IPT's Crane and Rigging Handbook

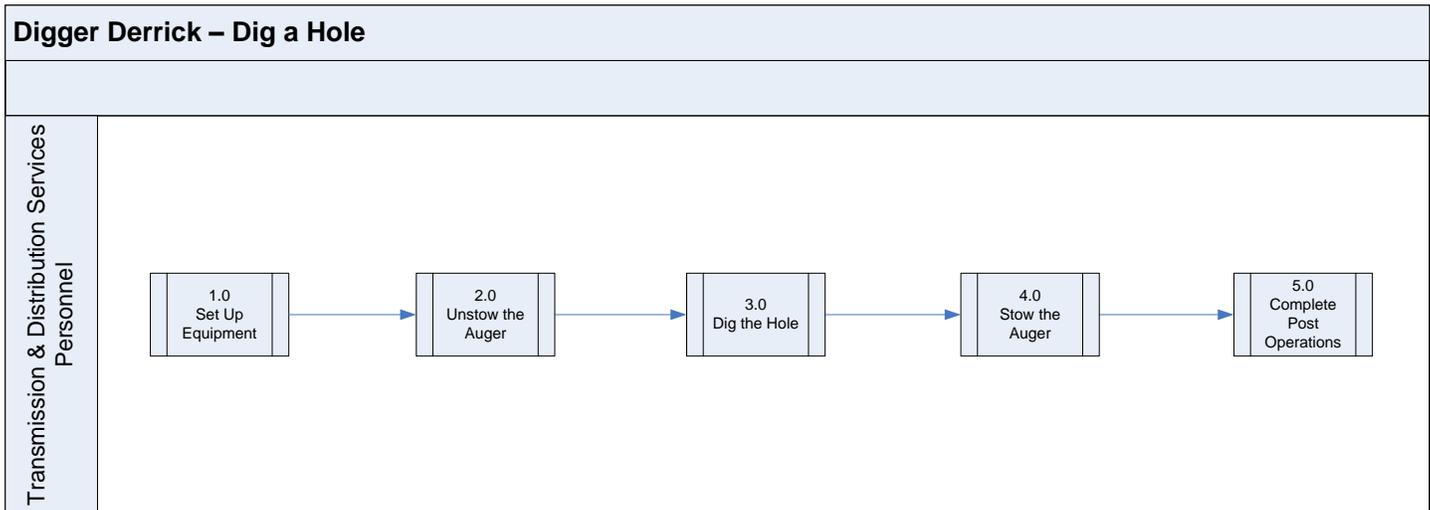
8.0 Planning and Preparation Checklist

Things to Check Before Starting the Procedure:

- Complete Hazard & Risk Assessment and Job Plan
- Complete Fleet Services' Digger Daily Inspection Checklist
- Complete OH&S Compliance - Perform Pre-Operational Equipment Checks
- Complete TRNSP Compliance - Perform Pre-Trip Air Inspections
- Complete TRNSP Compliance - Perform Pre-Trip Chassis Inspections
- Applicable Personal Protective Equipment (PPE) is available and in good condition
- Confirm locations of underground facilities

9.0 Procedure

High Level Flowchart



The Procedure

This Standard Operating Procedure (SOP) covers the method for digging a hole.

1.0 Set Up Equipment

1.1 Set Up Digger Derrick

1.1.1 The Digger Derrick Operator shall position the Digger Derrick as outlined within the job plan.

- *Ensure the area is clear*
- *Position the unit considering boom length and obstructions*
- *Apply the parking brake*
- *Engage the Power Take Off (PTO) as per manufacturer's specifications*

1.1.2 The Digger Derrick Operator and/or the Digger Derrick Operator Assistant(s) shall extend all outriggers.

- *As per manufacturer's specifications*
- *Ensure the area is clear*
- *Lay out outrigger pads as specified for the Digger Derrick*

Note: The use of outrigger pads is **mandatory** at all times.

- *Ensure outriggers are fully visible while extending*
- *Dig out surface area as required if outriggers cannot be fully extended*
- *Block the outriggers as required to stabilize the Digger Derrick*

1.1.3 The Digger Derrick Operator shall level the Digger Derrick.

- *As per manufacturer's specifications*

1.1.4 The Digger Derrick Operator and/or the Digger Derrick Operator Assistant(s) shall ground the Digger Derrick if identified within the Hazard and Risk Assessment.

1.2 Establish Required Hole Depth and Width

Note: For non-wood poles: Engineer's specifications are provided in the job order for the required width and depth.

1.2.1 The Digger Derrick Operator and/or the Digger Derrick Operator Assistant(s) shall establish the required depth of the hole using pole length and Construction Standards.

- *To find pole length examine the manufacturer's date stamp located on the side of the pole, or the stamp on the butt-end of the pole or*
- *Measure the wood pole(s) with a tape measure*

1.2.2 The Digger Derrick Operator and/or the Digger Derrick Operator Assistant(s) shall establish the required width of the hole.

- *Pole width is determined by measuring the diameter of the butt-end of the pole.*
- *A hole width of at least 8 inches wider than the diameter of the pole*

2.0 Unstow the Auger

2.1 Unstow the Auger

2.1.1 The Digger Derrick Operator shall elevate the boom.

- *Ensure the area is clear*
- *Consider the potential swing area of the auger in the event of sudden release*
- *The boom must be positioned for the Auger to clear the Digger Derrick utility body and operator*

2.1.2 The Digger Derrick Operator shall fully retract all boom extensions.

2.1.3 The Digger Derrick Operator shall shift the digger speed into Low.

- *Winding and unwinding the auger at low speed gives the Operator more control*

2.1.4 The Digger Derrick Operator shall remove any slack in the stow cable either by using the Dig or Clean control lever.

2.1.5 The Digger Derrick Operator shall lower the auger.

- *The auger should be lowered in a position where the auger would strike the ground if the stow cable should break*
- *Activate the auger storage release*

- *The auger must be lowered until it is in the vertical position and the stow rope swings clear*
- *Do not change auger speeds while lowering the auger as it may freewheel and control of the may be lost*

3.0 Dig the Hole

3.1 Dig the Hole

3.1.1 The Digger Derrick Operator shall keep the auger vertical.

- *Ensure the area is clear*
- *Be aware of potential obstacles*
- *Use the first section retraction, extension, and boom rotation controls as required*

Note: There must be no excessive side load on the boom.

3.1.2 The Digger Derrick Operator shall consider the following if digging on an incline.

- *Level and clear the digging area with a shovel before setting the auger*
- *Angle the auger to the point where the auger is at a 90 degree angle to the incline*
- *Turn the auger several times before starting a gradual return of the auger to the vertical position*

3.1.3 The Digger Derrick Operator shall access the "Digger Derrick - Dig a Hole - Soil Type Digging Index" component to confirm digging method.

3.1.4 The Digger Derrick Operator shall dig the hole.

- *Ensure the area is clear*
- *Do not change auger digging speed while it is rotating unless the digger head is a hydrasync (designed to be shifted on the fly). All other digger heads are to be stopped when shifting speeds*

Caution: If the auger stalls in the hole while digging, do not extend or retract the extension cylinder with the digger head at full pressure as this may damage the hydraulic extension tube.

- *Lift and clean the auger frequently to remove excess soil until desired depth is obtained*

Note: It can be difficult to raise an auger if it has been allowed to drill too deeply in a single pass.

3.2 Clean the Auger

3.2.1 The Digger Derrick Operator shall raise the auger and boom.

- *Ensure the area is clear*

3.2.2 The Digger Derrick Operator shall clean the auger.

- *Spin off soil from the auger according to manufacturer's specifications*

- *or*

3.2.3 The Digger Derrick Operator Assistant(s) shall clean the auger using a shovel, as required.

3.3 Is the Hole Deep Enough?

3.3.1 The Digger Derrick Operator Assistant(s) shall measure the depth of the hole.

- *Yes, (hole is deep enough), proceed to step 4.1 Stow the Auger*
- *No, (hole is not deep enough), proceed to 3.4 Has Auger reached maximum depth?*

3.4 Has Auger Reached Maximum Depth?

3.4.1 The Digger Derrick Operator shall determine whether the auger has reached maximum depth.

- *Yes, (auger has reached maximum depth), proceed to step 3.5 Extend the Auger*
- *No, (auger has not reached maximum depth), return to 3.1 Dig the Hole*

3.5 Extend the Auger

3.5.1 The Digger Derrick Operator shall place the auger in the hole.

- *Ensure the area is clear*

3.5.2 The Digger Derrick Operator Assistant(s) shall remove the Grade 5 - 5/8" Bolt which connects the auger to the Kelly bar.

3.5.3 The Digger Derrick Operator shall raise the boom until the holes in the auger shaft and the Kelly bar line up to the required depth.

- *The lowest hole on the Kelly Bar will allow the hole to be dug up to 12 feet*

3.5.4 The Digger Derrick Operator Assistant(s) shall replace the Grade 5 - 5/8" Bolt.

3.5.5 Return to step 3.1 Dig the Hole.

4.0 Stow the Auger

4.1 Stow the Auger

4.1.1 The Digger Derrick Operator shall shorten the auger to its lowest length.

- *Ensure the area is clear*

4.1.2 The Digger Derrick Operator Assistant(s) shall attach the stow cable to the auger stow hook.

4.1.3 The Digger Derrick Operator shall shift the digger speed into Low.

- *Winding and unwinding the auger at low speed gives the Operator more control*

- 4.1.4 The Digger Derrick Operator shall use the Clean or Dig control to wind up the auger.
- *The boom must be extended or raised up if the stow cable does not stay below the bell on the auger shaft*
 - *Once the stow cable has started to wind below the bell properly, fully retract all boom(s)*
- 4.1.5 The Digger Derrick Operator shall ensure the Auger Stow mechanism is locked in position.

5.0 Complete Post Operations

5.1 Perform Post Operational Duties

- 5.1.1 The Digger Derrick Operator shall completely retract all boom extensions.
- 5.1.2 The Digger Derrick Operator shall place the boom in the boom rest.
- *Ensure the area is clear*
- 5.1.3 The Digger Derrick Operator Assistant(s) shall secure the boom in the boom rest.
- *Using the proper tie-down points as per manufacturer's specifications*
 - *Stowing the boom with the winch line through the third stage is not allowed*
- 5.1.4 The Digger Derrick Operator shall retract outriggers.
- *Ensure the area is clear*
- 5.1.5 The Digger Derrick Operator shall disengage PTO as per manufacturer's specifications.
- 5.1.6 Disengage PTO.
- 5.1.7 End of Procedure.

10.0 Acronyms, Definitions and Symbols

Acronyms and Abbreviations

PTO - Power take-off

SOP - Standard Operating Procedure

Definitions

Blocking:

The act of building up materials to stabilize outrigger pads, refer to IPT's Crane and Rigging Handbook.

Butt-end:

The bottom of the pole, is more wide than the top end

Corkscrew:

Operator applies excessive downward pressure which causes auger to grab soil and auger binds in hole.

Freewheel:

To disengage the gears of the Digger head motor

Hardpan:

A layer of hard matter, especially clay, that lies under soft soil

Kelly Bar:

This bar goes inside the auger tube and telescopes out to drill deeper, used to connect the auger and the digger head.

Qualified operator (OH&S Regulation 204):

(i) the holder of a journeyman's certificate in the crane and hoist operator trade issued pursuant to the Apprenticeship and Trade Certification Act;

(ii) the holder of a proficiency certificate in a sub trade of the crane and hoist operator trade issued pursuant to the Apprenticeship and Trade Certification Act;

(iii) an apprentice in the crane and hoist operator trade who is working under the direction of a person described in sub clause (i) or (ii); or

(iv) any worker who:

(A) has received training, and has experience, in the safe operation of a crane that, in the opinion of the director, is equivalent to or superior to the training and experience of a person mentioned in [OH&S] sub clause (i), (ii) or (iii); or

(B) is a member of a category of workers whose training and experience in the safe operation of a crane, in the opinion of the director, is equivalent to or superior to the training and experience of a person mentioned in sub clause (i), (ii) or (iii).

Note: The approved SaskPower Digger Derrick Training Program meets the requirements of Regulation 204(iv) (A).

Snipe:

The top of the pole (narrower than the bottom end)

Vertical:

At a right angle to the horizon. In an upright position, or running lengthwise up or down

Symbols

N/A

11.0 SOP Components

The following is a list of components for this SOP which can be accessed through the SOP System:

SOP Component Name	SOP Component Type	SOP Component Description	Location of SOP Component
Digger Derrick - Dig a Hole Soil Type - Digging Index	Decision Table	Soil chart for digging method to use by soil type	SOP Online - Digger Derrick or Boom Truck - Operations - Dig a Hole
Digger Derrick - Dig a Hole	Flowchart	The high level and mid-level flowchart for the procedure.	SOP Online - Digger Derrick or Boom Truck - Operations - Dig a Hole

12.0 SOP Owner

SOP Owner

Operations Supervisor

13.0 References

N/A