Session: Miscellaneous Activities of Technical Helper

Learning Objectives	Evaluation Criteria
• Explain the role of a technical helper in the excavation process • Explain the trenchless laying process of the HT underground cable • Explain the miscellaneous activities of a technical helper	Interactive Questioning

	**Duration**	60 Minutes
	**Resources**	PowerPoint Presentation, Whiteboard, Markers, Screen and Projector
	**Facilitator's Notes**	In this session, take the participants through an interactive presentation with video snippets on the role of a technical helper in the excavation process. You will also explain the trenchless laying process of the HT underground cable along with the miscellaneous activities of a technical helper.

End of Notes

		**1.**	**Tell:** Welcome to the video presentation on the "Miscellaneous Activities of a Technical Helper". **Facilitator's Note:** Welcome the participants and give a brief overview on the session.
			**Facilitator's Notes:** • Display the slide • Read out the objectives and ask learners to note them • Inform them that they will be asked questions during the session **End of Notes**
		**2.**	**Tell:** By the end of this session, you will be able to: • Explain the role of a technical helper in the excavation process

			• Explain the trenchless laying process of the HT underground cable • Explain the miscellaneous activities of a technical helper
		3.	**Tell:** A technical helper plays a significant role as a subordinate in assisting the lineman during his routine work. However, while doing so, the helper is not authorised to operate any electrical equipment. The main duties of a technical helper are ensuring good housekeeping, maintaining tools and tackles, digging and refilling trenches and pits, pulling the cables, erecting poles, holding the ladder and providing the required tools and items from the ground to the lineman on the pole. The helper also has to mark the safety zone by placing cones, caution tapes and danger signs. He has to pull the handcart, rickshaw, cable drum and bring all the required materials to the site or work station. Let us look at how the technical helper assists the lineman in overhead works. First, the lineman and helpers mark the safety zone by placing safety cones and caution tapes around the work place.
		4.	**Facilitator's Note:** Click to play the video. **Tell:** It is the responsibility of the technical helper to hold the ladder firmly, so that the lineman can climb up the pole with his safety PPE and rope.
		5.	**Facilitator's Note:** Continue to play the video. **Tell:** The knot is tied in such a way that it should be easy for the lineman to untie it. Next, we will learn about the different kinds of rope knots.
		6.	**Tell:** Generally, five types of knots are used. They are: 1. Reef knot 2. Clove hitch 3. Round turn with two half hitches 4. Bowline and 5. Sheet bend **Facilitator's Note:** Click to play the video. **Tell:** Now, we will see the collective approach of technical helpers in pulling the LT AB

			cable.
		7.	**Tell:** The lineman inserts AB cable on the rollers of the pulley by the lineman. **Facilitator's Note:** Click to play the video.
		8.	**Tell:** The technical helpers pull the cable with the help of a rope. The other technical helpers lift the cable from the other side. **Facilitator's Note:** Continue to play the video.
		9.	**Tell:** Here, you can notice that the complete AB cable has been drawn and hooked up. **Facilitator's Note:** Continue to play the video. **Tell:** With this, you have seen the role of a technical helper in laying the overhead LT AB cable. Let us now look at the digging process. Here, the technical helper prepares the pole pit, cable trench and the test pit for preparing and testing of the cable joint.
		10.	**Tell:** Given here are the common tools used by technical helpers for digging and refilling: 1. Hoe (For digging soft soil and refilling) 2. Pickaxe (For digging hard soil) 3. Shovel (For refilling clay) 4. Crowbar (For removing hard rock) **Facilitator's Note:** Click to play the video.
		11.	**Tell:** Here, you can see the digging process is being carried out by the technical helper using the hoe and pick axe. The safety zone has been barricaded by cones and caution tape. **Facilitator's Note:** Click to play the video.
		12.	**Tell:** The depth of the pit for erecting a pole must be one sixth of the length of the pole. For HT 11m PCC pole, the depth is 183 cm (6 feet) and for LT 9m pole, it is 153cm (5 feet). The dimension of the pit is about 1.2m X 0.6m for smooth sliding and perfect placement of the pole in the pit. An inclined trench having 15.2cm (6 inches) width and 10.2cm (4 inches) length is dug adjacent to the pit, as shown in the diagram. **Facilitator's Note:**

			Continue to play the video.
		13.	**Tell:** Let us now see how the excavation of the test pit is carried out. **Facilitator's Note:** Click to play the video.
		14.	**Tell:** The HT cable will be sent straight through the joint. The dimensions of the pit will be 3m X 2m and depth will be 1.5m. **Facilitator's Note:** Continue to play the video. **Tell:** In this unit, you have seen the role of the technical helper in the excavation process. With this, you now know the details of the pit for erecting a pole. You have also learnt about the open cable trench and the test pit for preparing the cable joint. Now, we will see the role of a technical helper when a cable is being laid.
		15.	**Facilitator's Note:** Click to play the video. **Tell:** Here, the technical helpers are releasing the cable from the drum.
		16.	**Facilitator's Note:** Continue to play the video. **Tell:** Here, the HT 11 kV 3X400 sq. mm XLPE cable is being pulled by the trenchless machine.
		17.	**Tell:** Now, let us see the laying of cable in an open trench, where two HT cables are being laid. **Facilitator's Note:** Click to play the video. **Tell:** The 1.2m depth of the trench is the same as for a single cable. However, the width has been increased to maintain a certain gap between the cables.
		18.	**Tell:** Here, two HT cables of 3x300 sq. mm, called double circuit, are being laid in an open trench. **Facilitator's Note:** Continue to play the video. **Tell:**

			Now, a layer of 7.5 cm sand is being put over the cable. The sand is used to provide additional thermal insulation and to protect the cable from the UV effect. This helps in increasing the life of the cable. You can see that one of technical helpers is properly setting the sand layer and ensuring a uniform layer over the cable.
		19.	**Facilitator's Note:** Continue to play the video. **Tell:** Here, a mechanical protection has been given to the cables. The sand bed will be covered with brick or RCC docket. The technical helpers place bricks in a row, so that no one can strike a pickaxe or crowbar over the docket even by mistake. The HT cables remain protected from any damage.
		20.	**Tell:** Now, you may see the refilling of the open trench. **Facilitator's Note:** Continue to play the video. **Tell:** After completing the docketing, technical helpers are refilling the trench. First, they will fill the soft soil and then the hard soil excavated during the digging of the trench. They will ensure that the complete area is in its original form. For this, they will level the excavated soil to make it look neat and tidy.
			Tell: Let us now see the erection of the pole. In urban areas, poles are commonly erected with the help of a crane to save on labour and time. However, in rural areas, where the crane facility may not be available, a joint team of technical helpers erects the poles with the help of bipod and ropes. Let us see this procedure in detail.
		21.	**Facilitator's Note:** Click to play the video. **Tell:** After the excavation of pits is complete, poles are erected using a bipod / wooden horse made of 15cm G.I. pipe 6m long. The spread of the legs is 10m. The tie wire for attachment of the bipod to the pole is about 6m long and is made of 7/10 SWG. Stay wire of 3.15mm is attached to the pole at 8m. The pole, tied with 3 ropes, is slid along the line route. The rope at the bottom prevents the pole from being dragged in the direction of the pull.
		22.	**Facilitator's Note:** Continue to play the video. **Tell:** To prevent the support from moving aside when rising, two guy ropes are fixed on both sides and attached to the temporary anchor. The bipod is being placed in position and attached to the pole by means of the tie wire. The pull for lifting the poles is provided by the rope pulley. When the pole has reached an angle of 35° to 40°, the derrick and the bottom holding rope is slowly released. When the pole assumes the vertical position, the holding ropes should be

			held tightly. At the time of erection, it should be ensured that two men are shifting the bipod as required while the pole is rising. When it is free at 40-degree angle, they will be joined by other two men who are holding the rope.
			Tell: Now, let us see the erection of pole with the help of a crane. An 11m PCC pole is used in the HT 11 kV line. Here, they are erecting a DP structure.
		23.	**Facilitator's Note:** Click to play the video. **Tell:** Technical helpers have placed the chain at the centre of the pole, so that the pole is hooked and remains vertically balanced when lifted freely above the ground.
		24.	**Tell:** The anchor rope is fixed on the lower side of pole for manoeuvring the movement of the freely hanging PCC pole. **Facilitator's Note:** Continue to play the video.
		25.	**Tell:** Both the technical helpers firmly grip the anchors for smooth movement. **Facilitator's Note:** Continue to play the video.
		26.	**Tell:** Here, the vertically lifted pole has come over the pit. Technical helpers are managing its alignment by pulling the anchors, so that the pole can be placed at the exact location. **Facilitator's Note:** Continue to play the video.
		27.	**Tell:** Let us now look at the refilling process. Technical helpers use tampers in addition to the hoe, so that the soil firmly grips the PCC pole. They fill both the hard and soft soil in layers. They use the brick lining and hard soil as well. The hook of crane will be removed only after filling and tamping is complete. **Facilitator's Note:** Continue to play the video.
		28.	**Tell:** Let us now see the paving the soil of the pit. **Facilitator's Note:** Continue to play the video.

			Tell: The complete excavated earth material will be uniformly spread into its original condition to make the area neat and tidy.
		29.	**Tell:** In this unit, you have seen the trenchless laying process of the HT underground cable. You have seen how the trenchless machine pulls the cable from one end. You have also seen the role of technical helpers in smooth movement of the HT cable over the roller stools. This is the conventional method of the cable laying processes by preparing an open trench. You have further seen erection of the PCC pole in the conventional method, where the pole is erected manually by a team of technical helpers. You have also seen the erection of the PCC pole with the help of a crane.
			Tell: A technical helper supplies tools and accessories from the ground to the lineman who is on the pole, using the other end of the rope tied into a proper knot. The helper also assists in testing, repair and maintenance. A successful technical helper is one who has sound knowledge of handling tools, selecting the proper size of tools as well as their upkeep and storing procedures. Let us now look at the tools and tackles used by a distribution utility as part of its daily routine. It is desirable that a technical helper keeps all these items in safe custody and makes them available on demand.
		30.	**Facilitator's Note:** Click to play the video. **Tell:** Displayed here are the tools and tackles used by a technical helper on daily basis.
		31.	**Facilitator's Note:** Continue to play the video. **Tell:** Here, Mr. Sant Ram carries a detailed list of tools and tackles in his toolbox. He checks the items before leaving the Complaint Centre for the site or his home.
			Tell: With this, we have seen the entire video presentation on how the "Miscellaneous Activities of a Technical Helper" are performed.

		32-33.	**Tell:**
			Let us quickly recollect the key points of this session.
			• A technical helper plays a significant role as a subordinate in assisting the lineman during his routine work
			• The main duties of a technical helper include:
			  ○ Ensuring good housekeeping
			  ○ Maintaining tools and tackles
			  ○ Digging and refilling trenches and pits

Planning and Supervision

			○ Pulling cables, erecting poles ○ Holding the ladder and providing the required tools and items from the ground to the lineman on the pole ○ Marking safety zones by placing cones, caution tapes and danger signs ○ Pulling the handcart, rickshaw, cable drum and bringing all the required materials to the site or work station • Different kinds of rope knots used for activities include: ○ Reef knot ○ Clove hitch ○ Round turn with two half hitches ○ Bowline and ○ Sheet bend • The common tools used by technical helpers for digging and refilling are: ○ Hoe (For digging soft soil and refilling) ○ Pickaxe (For digging hard soil) ○ Shovel (For refilling clay) ○ Crowbar (For removing hard rock) • In urban areas, poles are commonly erected with the help of a crane to save on labour and time • In rural areas, where the crane facility may not be available, a joint team of technical helpers erects the poles with the help of bipod and ropes