WORK PROCESS SCHEDULE
TELECOMMUNICATION TOWER APPRENTICE (LEVEL 1)
O*NET-SOC CODE: 49-2021.00 RAPIDS CODE: 2030CB

ON-THE-JOB LEARNING

Description: Telecommunication Tower Apprentice is a supervised member of a crew performing general construction activities with an emphasis on tower system installation and maintenance and inspection of existing support structures used in the provision of essential Telecommunication systems, including personal wireless communications, public safety communications, utility networks, and broadcasting.

On the Job Competencies:

	Evaluation	***COMPONENT 1***	***COMPONENT 2***	***COMPONENT 3***
Safety Training • **OSHA 10 (Telcom)** • **Authorized climber** • **Personal Protection Equipment(PPE)** • **CPR/First Aid/BBP** • **Radio Frequency(RF) awareness** • **Jobsite Safety Analysis(JSA)** • **Scope of Work (SOW)**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification
Technical Training • **SOW** • **Basic rigging** • **Material handling**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification

• **Ropes/knots**				
Operate Hand and Power Tools • **Drills/saws**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification
Operate trucks, trailers, and equipment • **Knowledge of proper DOT regulations if applicable** • **Load securement**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification
Introduction to various types of structures and appurtenances • **Self-Supporter** • **Guyed** • **Monopole** • **Stealth Structures** • **Rooftop** • **Antennas**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification

Telecommunication Tower Apprentice Descriptions

Safety Training

- *OSHA 10 (Telecom)* – Currently there are 10 hour courses that are tailored to telecommunications work. These 10 hour courses are the primary means to be used. However until such a time as the TIRAP Board is able to work with OSHA to have a new 500 course in place, we will be recognizing a construction-based 10 hour course. Employees must receive a card showing they have completed the course.

- *Authorized Climber* – Upon completion the apprentice will have the clear understanding of the necessity of 100% connection 100% of the time to a proper attachment point, along with the need to apply this with a clear understanding of the SOW. The employer must authorize the employee to be able to work at height after completing the classroom and competency-based testing of the apprentice. Authorized Climber Training must meet or exceed the requirements of all current OSHA requirements and American National Standards Institute (ANSI) Standards for Fall Protection/Rescue with regards to becoming an Authorized Climber.

- *Personal Protection Equipment (PPE)* - Each apprentice must be trained in the inspection, care and use of PPE for the particular SOW and hazards addressed through their use. While the apprentice is being trained in PPE inspection, care and use, they are to be under direct supervision of a journey worker at all times, enabling them to draw on the competencies of the journey worker as they grow in experience in the inspection care, and proper use of PPE. Examples of PPE used by an apprentice include: hard hat, proper footwear, eye/face protection, hearing protection, and fall protection equipment. This list is not exclusive or exhaustive as the SOW may require the supervisory, journey worker to engage other types of engineering controls or safety measures.

- Cardiopulmonary resuscitation *(CPR)/First Aid/Bloodborne Pathogens (BBP)* – This course is recognized as completed as long as it meets or exceeds the requirements of the American Red Cross or American Heart Association. The employee must achieve certification in accord with at least one of these two programs.

- *Radio Frequency (RF) Awareness* – This course is designed to enable the apprentice to have an understanding of the RF-related hazards and the ability to understand basic antenna types, RF patterns and potential for exposure. Apprentice(s) will also be trained in the use of a RF meter along with the bands that it is designed to monitor. Testing shall be both a written exam and demonstration of the proper use of an RF monitor. This training shall meet or exceed the requirements of all current Federal Communications Commission-Office of Engineering and Technology (FCC OET) Bulletins with regards to Human Exposure levels.

- *Jobsite Hazard Analysis (JHA)* – A primary goal of this program is that the apprentice understands the necessity of SOW comprehension and the subsequent jobsite hazards that SOW could expose the apprentice or other crew member to as a part of performing the SOW. Apprentice must be able to communicate the hazards outlined in a JHA and identify the means necessary to abate the hazard and/or PPE use required to protect against these hazards. Proper planning allows for quality work in an efficient manner, and it is through this planning that the apprentice will be able to ensure safety for themselves as well as the other members of the team. Testing will involve written exams requiring the apprentice to demonstrate their understanding of the jobsite hazards and appropriate steps to mitigate those hazards.

- *SOW* – The SOW is the goal for each site. Due to the nature of the work the goal changes depending on the site and the technology being applied. The SOW must be understood and communicated by all. During their time as an apprentice it is critical that they take the time to understand the SOW and the means for accomplishing it. Testing will involve written exams allowing the apprentice to demonstrate their understanding of the SOW and the communication with management to ensure that the work is of the appropriate quality and safety for the respective structure.

Technical Training

- *SOW* – See *Scope of Work* section above

- *Basic Rigging* – Apprentice will be trained in the basic rigging skills. This will involve the handbook for riggers course allowing them to have reference material as they are learning on the job under the supervision of a journeyworker. The apprentice is encouraged and allowed to participate in rigging applications on a jobsite required by the SOW, however the apprentice is not allowed to rig on a jobsite without direct supervision by a journeyworker.

- *Material Handling* – All material must be handled appropriately. Size, weight and structure of materials will require different methods and equipment as appropriate, to handle safely. The apprentice will also be trained in the proper storage of materials. Due to the remote nature of the work sites it is important that the apprentice be instructed in the requirements that some materials are weather sensitive, some are prone to theft and some could be blown away and create damage or loss. Transporting materials is a daily consideration in telecommunications so the apprentice must also learn proper loading and tie down of various types of materials. It is important for the apprentice to understand and come to competency through on the job experience. Few examples that must be trained and tested:

    - Loads on vehicles
    - Tagging a load
    - Planning for securement of a load on a structure
    - Proper lifting to avoid injury. Use mechanical advantage, buddy system, or rigging.

- *Ropes/Knots* – The apprentice is to be trained in the proper utilization and care of ropes. He/she must be able to recognize the difference between the types of ropes and their appropriate use. The apprentice must also be taught how to properly inspect, handle, care for and store the ropes. Apprentice must be able to determine the difference between safety ropes or rigging ropes. It is critical that the use of the blocks and load ratings be trained and competency developed. The apprentice shall have training on the required knots for the industry. Written and competency testing is required. Must be able to tie the following basic knots:

    - Bowline
        - Inline
        - Normal
    - Clove Hitch

Operate Hand and Power Tools

- *Drills/Saws* – Training in the proper use, storage, required PPE and safeties. Basic tools of the trade are wrenches, screw drivers, knives, drills, band-saws, chop saws, block and tackle, ropes, power cords and Ground Fault Circuit Interrupter (GFIC) interfaces, capstan hoists, etc.

Operate Trucks, Trailers, and Equipment

- *Knowledge of Applicable DOT Regulations* – Not all apprentices will operate motor vehicles. Training will cover DOT requirements and exemptions that apply to our industry. All driving apprentices will be trained in the use of the vehicles that will be used and other equipment that may be required for the operation of the vehicle. Testing includes a written exam and a driver test under the supervision of a journeyworker.

- *Load Securement*

Introduction to Various Types of Structures and Appurtenances

- Introduction to various types of structures and appurtenances is ongoing during the apprenticeship. The overview will provide them with a basic understanding of the various types of structures and the unique requirements for each. A written examination will be required that demonstrates the apprentice is aware of difference in access to perform the SOW on each of these structures, appropriate tie-off points available and how rigging for the SOW may be impacted by the different types of structures.

- Self-Supporter
- Guyed
- Monopole
- Stealth Structures
- Rooftop
- Antennas
- Water Tanks

WORK PROCESS SCHEDULE
TELECOMMUNICATION TOWER TECHNICIAN (LEVEL 2)
O*NET-SOC CODE: 49-2021.00 RAPIDS CODE: 2030CB

ON-THE-JOB LEARNING

Description: Telecommunication Tower Technician is a member of a crew performing general construction activities with an emphasis on tower system installation and maintenance and inspection of existing support structures used in the provision of essential telecommunication systems, including personal wireless communications, public safety communications, utility networks, and broadcasting.

On the Job Competencies:

	Evaluation	***COMPONENT 1***	***COMPONENT 2***	***COMPONENT 3***
Safety Training • **Authorized Person Training** • **Competent climber** • **Rescue training** • **Personal Protective Equipment(PPE)** • **Radio Frequency(RF) awareness** • **Jobsite Safety Analysis(JSA)** • **Scope of Work (SOW)**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification
Technical Training • **SOW** • **Basic rigging** • **Material handling**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification

• **Ropes/knots** • **Antenna/Line installation and maintenance** • **Lighting system installation and maintenance** • **Tower structural installation and maintenance** • **Applicable standards awareness** • **Exothermic welds** • **Test equipment**				
Operate Hand and Power Tools • **Drills/saws** • **Torches** • **Connector tools** • **Tools applicable to the SOW**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification
Operate trucks, trailers, and equipment • **Knowledge of proper DOT regulations if applicable** • **Load securement** • **Familiarization of capstan hoist** • **Equipment applicable to the SOW**	Competency-based, written, and or practical	Baseline training	Intermediate training	Completion/Mentors verification certification
Introduction to various	Competency-	Baseline training	Intermediate training	Completion/Mentors

types of structures and appurtenances • **Self-Supporter** • **Guyed** • **Monopole** • **Stealth Structures** • **Rooftop** • **Antennas**	based, written, and or practical			verification certification

Telecommunication Tower Technician (TTT) Descriptions

Safety Training

- *Authorized Person Training* – This training will ensure that the TTT understands and is able to demonstrate that they have the authority from the employer to perform quality work in the safest of manners. This will require that they have a clear understanding of the SOW and the PPE or abatement means used to address any hazards. Specific emphasis shall be placed on fall hazards and the ability to exercise their responsibility as an authorized person by the employer.

- *Competent Climber* - The apprentice must be trained to advance from an authorized climber to a competent climber before he/she can become a TTT. Competent Climber training must meet or exceed applicable sections in OSHA Standard 29 CFR 1910 and 29 CFR 1926. It must also meet or exceed applicable sections of ANSI Z359 and the NATE CTS. Written testing and continuous, critical observation by a journeyworker while in-training are required. Here is a list of some of the topics that need to be inculcated in this training:

    - understanding fall restraint, fall restriction and fall arrest
    - anchors and anchor connectors
    - harnesses and connector devices
    - lifelines, vertical and horizontal
    - safety climb systems
    - hazard recognition and control (fall distance calculations)
    - *Authority* to take the necessary corrective measures to ensure safety on the site

- *Ongoing Training Requirements*

    - Rescue training – this training can be done simultaneously with Competent Climber training or conducted separately once the apprentice has achieved Competent Climber status. Applicable standards noted above will also apply to this portion of the training. Additional elements of training will include a review of ropes and knots appropriate for rescue, controlled descent devices, how to safely raise/lower someone from an elevated structure and hands on practical exercises until the TTT is competent with the procedure. At a minimum, rescue training must be refreshed annually.

    - Personal Protective Equipment (PPE) - PPE: each TTT must be trained and competent in the identification, inspection, care and use of PPE necessary for the particular SOW. The employer may authorize a TTT to supervise apprentices in the use of PPE. Examples of PPE used by a TTT include: hard hat, proper footwear, eye protection, hearing protection, and fall protection/rescue equipment. This list is not exclusive or exhaustive as the SOW may require the engagement of other types of engineering controls or safety measures.

- *Radio Frequency (RF) Health and Safety Training (H&S)* – RF H&S training must comply with applicable portions of OSHA Standards 29 CFR 1910 and 29 CFR 1926 as well as FCC 47 CFR 1 and ANSI/IEEE C95.1- 6 & 7. It will give the apprentice a working knowledge of electromagnetic emissions and emitting devices such as antennas, radios, and other emission sources of RF energy. Allowable exposure limits and how to protect employees and the public from adverse effects of RF or Electromagnetic Energy (EME) exposure will be taught. The apprentice is to work under the direct supervision of a competent person. The apprentice must be able to show through testing and demonstration the basic types of antennas and their RF emission characteristics. In addition the apprentice is to be trained in the use and understanding of a personal RF monitor. The apprentice must be able to recognize what frequency range a personal RF monitor functions in and be able to match the correct monitor(s) to the antenna types encountered at any given job location.

- *Jobsite Hazard Analysis (JHA)* – A JHA is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the apprentice, the task, the tools, and the work environment. Ideally, after you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level. The JHA is a critical part of any successful jobsite. This takes in to account the SOW and the site specific safety concerns that the SOW introduces. The apprentice must be able to comprehend the SOW and identify subsequent Jobsite Hazard's that the SOW would or could expose apprentice(s), other workers or the public to as a part of performing the SOW. The JHA is also site specific and includes conditions such as public access or weather as an example. Once these hazards are identified, the apprentice must learn what steps to take to eliminate the hazard or how to otherwise prevent an accident from occurring. A JHA should be initiated, as a minimum, on a daily basis or when the SOW or site conditions change. The apprentice must also be able to determine where the closest available emergency medical resources are to the jobsite in the event something does happen that requires prompt medical attention.

- *Scope of Work (SOW)* – A statement of work or SOW is a formal document that captures and defines the work activities, deliverables, and timeline a vendor must execute in performance of specified work for a client. The SOW usually includes detailed requirements, with standard regulatory and governance terms and conditions. The apprentice must learn the importance of fully understanding the SOW and be able to determine the type of tools, equipment and manpower it demands. The apprentice must also be able to understand what type and quantities of materials will be required as well as who is responsible for furnishing and delivering them to the jobsite. The apprentice must also understand his role in the successful completion of the SOW.

Technical Training

- SOW – Due to the nature of the work the goal changes depending on the site and the technology being applied. The SOW must be understood and communicated by all. As a TTT it is critical that they are familiar with the SOW practices along with the critical components relative to their role, with the sound means to accomplish it safely and in accordance to the customer standards. Testing will involve written tests allowing the employee to demonstrate their understanding of the SOW and also the communication flow through management to ensure that the work is of a quality nature in the safest manner for the structure being worked on.

- *Basic Rigging* – Telecommunications Tower Technician should be able to identify rigging components, inspect each prior to use and provide a written and oral understanding of the use of each. TTT must:

    - possess an understanding of working load limits, angle multipliers and rigging hitches
    - be competent in capstan operations and the load limits
    - possess written and verbal knowledge of tagging and self-trolley systems
    - know and demonstrate proper hand signal for safe crane operations as identified in ANSI B30.5

- *Material Handling*

- *Ropes/Knots* – The TTT shall have demonstrated competency in the use, care and inspection of ropes. They shall be able to identify the type of ropes commonly used and their load capabilities and unique properties. In addition they shall be able to properly tie the required knots.

- *Antenna/Line Installation and Maintenance* – The TTT shall be able to understand and communicate the common SOW's for this type of work along with the difference commonly encountered depending on the structure type.

- *Lighting System Installation and Maintenance* – The TTT shall be able to understand and communicate the common SOW's for this type of work along with the difference commonly encountered depending on the structure type. In addition the TTT shall be able to show understanding of the FAA requirements.

- *Tower Structural Installation and Maintenance* – The TTT shall be able to understand and communicate the common SOW's for this type of work along with the difference commonly encountered depending on the structure type.

- *Applicable Standards Awareness* – This is an ongoing part of the TTT training and education. The industry standards will serve as the baseline for this section. In addition the TTT shall be able to speak to applicable client and regulatory standards. Of particular note will be manufacture's standards and how they comply with the current installs.

- *Exothermic Welds* – The TTT shall demonstrate that they are able to identify the proper molds and shots to be used. In addition they shall be able to specify the proper PPE and material prep.

- *Test Equipment* – The TTT shall have competency with client and manufacturer requirements.

- *Basic Understanding of Regulatory Issues* – To include information on EPA, migratory birds, endangered species. This training is meant to convey to the TTT their responsibility to be aware of these types of issues and to report them to the competent person on site.

Operate Hand and Power Tools

- As a TTT the employee must be able to demonstrate competency with normally used tools. This will include understanding the manufactures instruction documentation, and proper application of the tool to the SOW in a safe manner. In addition a TTT shall have the authority to tag out tools and equipment.

- *Drills/Saws* – TTT shall understand and be able to demonstrate the proper inspection of the tool and the required guards.

- *Torches* – TTT will have the ability to determine the hazards associated with the use of this type of tool and any fire watch that may be necessary as a part of the use.

- *Connector Tools* – The TTT is to have completed the connector courses for the normal types of connectors to be utilized by the employee. The most critical part of this training is the need for the apprentice to understand that the connectors change in specifications from time to time and that it is essential for them to check the instructions to ensure proper install of the connectors.

- *Tools Applicable to the SOW* – The TTT will have the responsibility to understand the use of the tools for the SOW and how they are to be inspected and cared for. A critical part of this training will be the responsibility of the TTT to request training when required to utilize a tool that they have not previously been trained for the use of.

Operate trucks, trailers, and equipment

- *Knowledge of Applicable DOT Regulations* – NOTE: this is intended only for the drivers as an apprentice, however a TTT must have at the very least and overview of the DOT rules as they apply even in the event that they are not a driver. The intent is to support the drivers in doing the right thing for the right reasons.

- *Load Securement* – TTT shall be competent in the securement of loads.

- Competent in the operation Capstan Hoist – As a TTT the apprentice shall be trained in the proper use, care and inspection of the hoist and shall have training to understand the responsibilities as an operator. They shall satisfactorily complete the training on proper capstan hoist use.

- *Equipment Applicable to the SOW* – The TTT will have the responsibility to understand the use of the equipment for the SOW and how it is to be inspected and cared for. A critical part of this training will be the responsibility of the TTT to request training when required to utilize a type of equipment that they have not previously been trained for the use of.

Introduction to Various Types of Structures and Appurtenances

- As an apprentice moves through the process and fulfills the requirements for advancement to the TTT position it is important that they move from a basic understanding of the structure types to some of the specific concerns and standards that apply to the structures. In addition it is important to note that the type of material and manufacturing processes be understood. To this end it is required that the TTT have an understanding of the ANSI TIA 222 (emphasis on sections 11, 12, 13, 14, as well as annex I, J, K) as well as ANSI/TIA 1019-A.

    - Self-Supporter
    - Guyed
    - Monopole
    - Stealth Structures
    - Rooftop
    - Antennas
    - Water Tank

RELATED INSTRUCTION OUTLINE
TELECOMMUNICATION TOWER TECHNICIAN
O*NET-SOC CODE: 49-2021.00 RAPIDS CODE: 2030CB

The TTT Apprenticeship Program is comprised of a minimum of 144 hours related classroom instruction, which will be completed over a term of one-year (1).

Description: Related instructional courses provide technical ability and a basic understanding of the Telecommunication industry. The following are courses to be completed during the term of apprentice and under direct supervision of a TTT:

Core Skills:		**Approximate Hours**
1.	**OSHA 10 Hour**	**10**
2.	**Hazard Assessment and Communication**	**30**
3.	**RF Assessment and Exposure**	**15**
4.	**First Aid/ CPR**	**10**
5.	**Competent Climber**	**15**
6.	**Competent Rescue**	**20**
7.	**DOT Driver Rodeo**	**10**
8.	**Basic Rigging Principals**	**20**
9.	**Exothermic Welding**	**10**
10.	**Line Support and Weather Proofing**	**10**
11.	**Introduction to Standards**	**10**
	TOTAL HOURS:	**160**

Course Description

OSHA 10 Hour: This is a version of the OSHA 10 hour course that is provided by a trainer that has been authorized to perform instruction from OSHA. This 10 hour course is specifically targeted to the Telecommunications Industry and has emphasis placed upon fall hazards.

Hazard Assessment and Communication: An introduction to the various structures that work will be performed on. Based upon the SOW and the type of structure it is being applied to the hazard's may change and this requires the ability to understand that there is a hazard and it must be communicated to the rest of the team.

RF Assessment and Exposure: PPE is not enough. It is important for there to be an understanding of the hazard associated with RF and the ability to work as part of a team to communicate the hazard and means of abatement or use of PPE for protection.

First Aid/CPR: These courses follow the agendas established by Red Cross/American Heart Association.

Competent Climber: A Competent Climber is one who has the authority to act and correct unsafe conditions. In order for a person to accomplish this they need to understand the SOW and the structure it applies to. Climbing path, rigging path, fall protection tools and PPE are just a few examples of the subject matter addressed as part of this training.

Competent Rescue: Due to the nature of the work and the remote locations it occurs in crews have to rely on their members or other nearby crews for rescue. Many first responders do not have the ability to perform rescue at 200 + feet in the air. Due to this a TTT must be trained in the ability to self-rescue and to perform rescue for others. This will involve the proper planning and the types of equipment that are required.

DOT Driver Rodeo: Travel from one site to another is one of the greatest risks that face workers in this industry. This course will take the apprentice through the DOT rules and regulations for the industry. Specific emphasis is placed upon proper rest, vehicle inspection, trailer inspection and backing, merging in and out of traffic, and what to do in the event of an emergency.

Basic Rigging Principles: Rigging is a critical component of the job functions. The apprentice must be able to understand the SOW and the structure that it is going to be applied to in order to be a part of creating the rigging plan for the site. Special consideration is to be placed on obstructions, safety considerations, rigging components, and communications.

Exothermic Welding: Process for joining materials that employee's molten metal for the purposes of making an electrical bond for grounding. Grounding, typically five ohms or less, is essential for proper functional of site and tower related equipment and appurtenances. Understand and demonstrate the basic safety principles of exothermic welding.

Line Support and Weather Proofing: The industry's use of line and type is changing, but the proper support and weather proofing of these lines is as critical as ever. Apprentice is provided with the standards for the support and weather proofing of the lines. In addition drawings and specifications are reviewed so the apprentice can have an understanding of where to look in the event that there is a change in the client or industry standards.

Introduction to Standards: During this portion the apprentice is introduced to some of the critical standards for the industry. ANSI/TIA 222 G, ANSI/TIA 1019A, FAA 7460, FCC OET documents, are a few of the standards that are covered regarding their use. As an example the 1019A is used during the modification of an existing structure and this is to be reviewed with the apprentice so that they have an understanding of how to use these standards as reference documents.