

AL210 ALUMINIUM ROOF TOWER – INSTALLATION MANUAL

DO NOT install this equipment unless you have been instructed in its safe use and operation and have been given permission.



Never install equipment during storm activity. There is no safe location outdoors during a storm event. If you can hear lightning you are in danger of being struck.

Look up and live. You may be killed if the equipment comes in contact with powerlines. Always think ahead and plan your task in advance.

PERSONAL PROTECTIVE EQUIPMENT



Gloves recommended.



Sturdy, enclosed footwear to be worn at all times.








Personal Fall Arrest System (PFAS) required for at-heights installation. Qualified personnel only.






Hard hat recommended.

GENERAL SAFETY & REGULATORY REQUIREMENTS

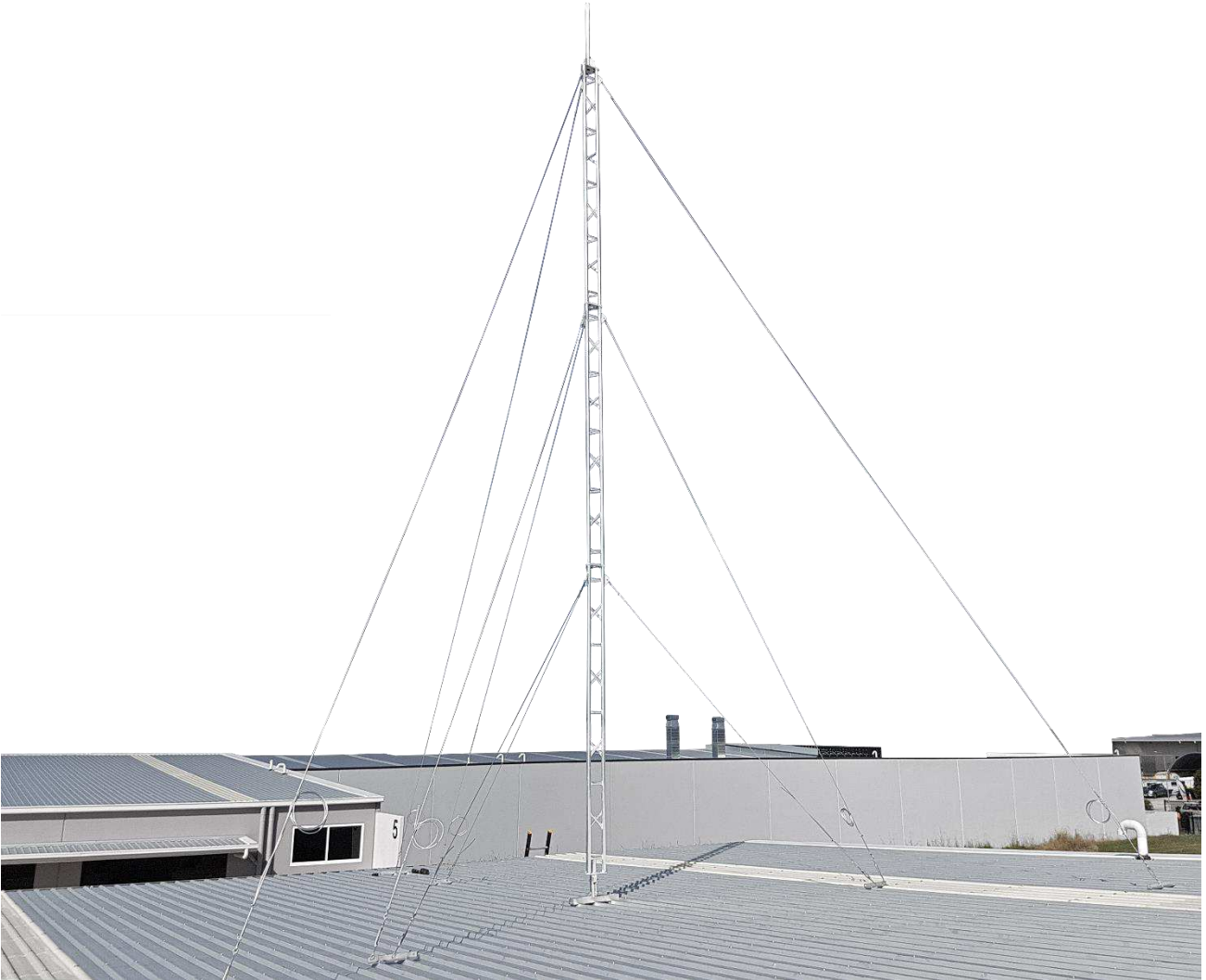
DO

-  Check workspaces and surrounding area to ensure no slip/trip hazards are present.
-  Check installation area for obstructions and electrical cables.
-  Ensure underlying roof structure is structurally sound. Engineer inspection may be required.
-  Ensure correct weatherproofing process is followed.
-  Installation by qualified personnel only. Check state and local regulations for safety and building code requirements. Installation may require council development approval.

DON'T

-  Do not install near powerlines.
-  Do not install during a storm event.
-  Do not install on your own. A minimum team of two is required for most tower sizes, larger teams are required for larger towers.

COMPLETED INSTALLATION



INSTALLATION PROCEDURE

This procedure covers steps required to install the Blackhawk AL210 series aluminium roof lattice tower onto an ordinary metal roof. The tower size used in this installation example is a 9.6 metre three section model.

Step 1.

Unload and check supplied materials. Package should include;

- 2x AL210 3.1 metre aluminium lattice modules
- 1x AL210 3.1 metre aluminium lattice base module
- 1x AL210 spigot or headframe (spigot pictured)
- 1x AL210 multi-axis base, with M12 bolt + nylock
- 6x guy wire anchor plates (quantity depending on installation)
- 1x spool of 6 mm 7x19 strand guy wire (galvanised or stainless steel)
- 9x turnbuckles (galvanised or stainless)
- 32x wire rope clamps / saddles
- 18x 7/16" bolts and nylocks
- 18x guy wire thimbles

You will need:

- 2x 16 mm / 7/16" spanners (or shifters)
- 2x 18 mm spanners (or shifters) for M12 (multi-axis base)
- Spirit level
- Measuring tape
- 11 mm socket for wire rope clamps / saddles
- Socket set
- 6 mm drill bit
- Driver / drill
- Weatherproofing silicone
- Additional roof screws as necessary



Step 2.

Inspect underlying roof structure and identify installation position for tower multi-axis base. Ideally the tower will be raised in the direction of the downwards slope – this will minimise lifting effort and permit a safer installation.

Ensure sufficient footprint area available for guy wires. A 9.6 metre tower on this flat roof requires a 5400 mm radius to maintain optimal 60° guying.

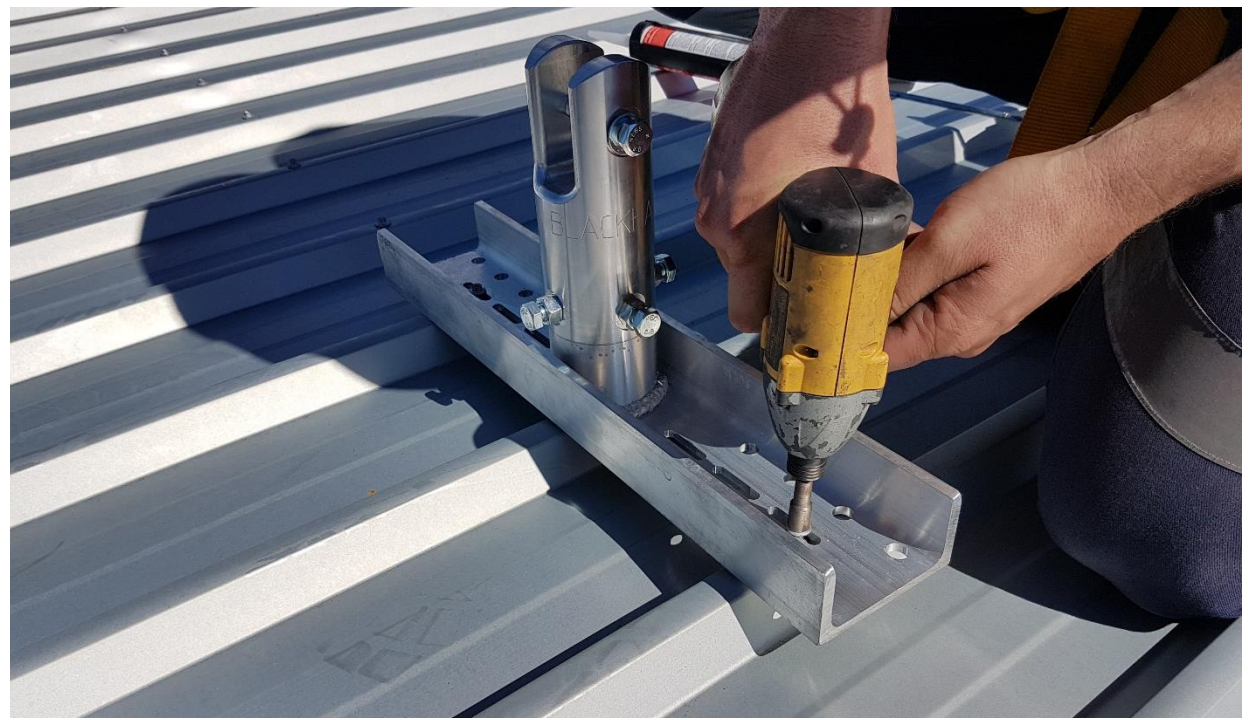
Use industry standard calculation tools to determine radii and associated guy wire lengths.



Step 3.

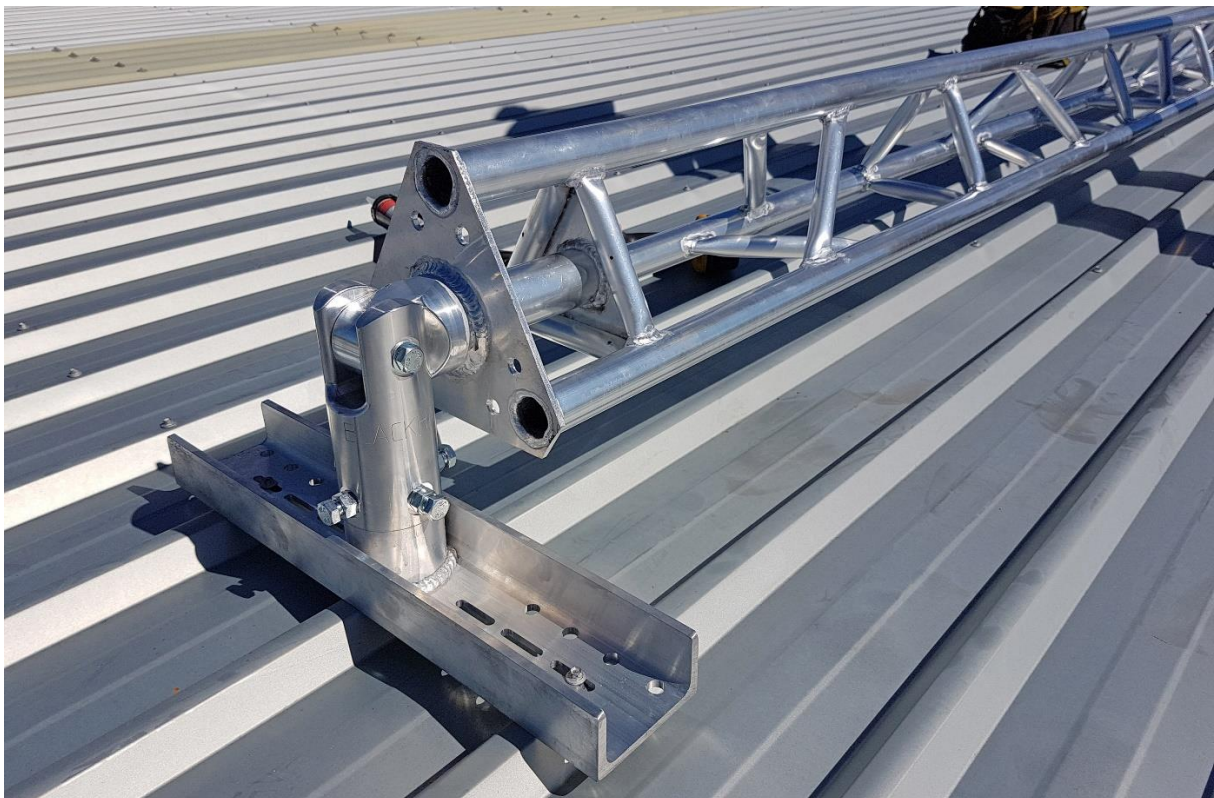
Position multi-axis base, remove and replace roof screws, ensuring ample application of silicone. Secure with additional roof screws if necessary.

Larger roof towers employ a more advanced base frame to better distribute compression load.



Step 4.

Attach AL210 3.1 metre lattice base module to multi-axis base using M12 bolt. Thread nut until firm but do not fully tighten yet. Do not attach additional tower modules at this stage.



Step 5.

In order to safely raise the fully assembled tower it's important that guying is completed for the first three metre section so that when we raise the tower the first three metre section can be anchored off and the tower remains upright.

Prepare guy wire attachment by attaching thimbles to tower. Thimbles are widened by hand and closed once attached. Guy wire is looped through the thimble and two saddles are used to clamp guy wire.



Step 6.

Push the first guy wire saddle as close as possible to the thimble. Observe the “never saddle a dead horse” rule – nuts must be facing the direction of the main cable and not the severed tail.

Use 11 mm socket to tighten saddle nuts, alternate tightening to ensure both nuts are as tight as possible.



Step 7.

In this example we are using six guy anchor plates, attaching the three metre and six metre guy wires to our inner plate. To maintain a 60° pitch for our six metre guy wires the inner three anchor plates are placed at a distance of 3.6 metres.



Step 8.

Depending on anchor plate variation it may be necessary to drill holes matching the corrugation distance on your roof design. Remove and replace roof screws and secure plate tight. Use brush or blower to remove swarf.



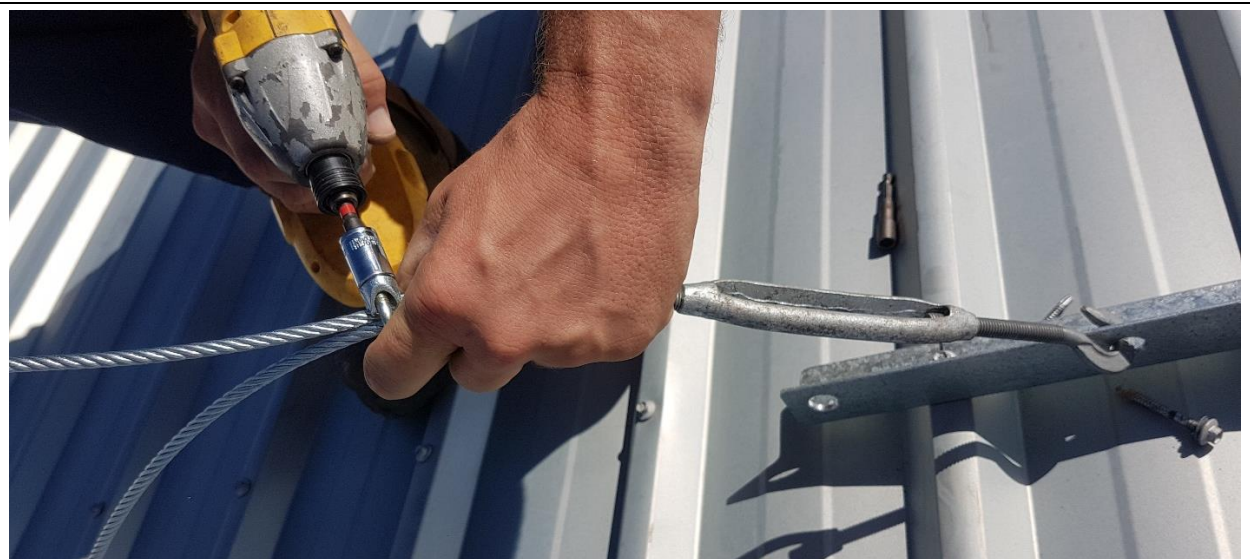
Step 9.

To attach guy wires we need to raise our first tower section in order to ensure the correct measurements. As each section weighs about 12 kilograms the tower can safely be raised by hand. Have one team member hold the tower section in place, ensuring the guy wire tabs remain lined up with the guy anchor plates. Lock off the rotational axis by tightening the four M12 locking bolts on the multi-axis base using two 18 mm spanners or shifters.



Step 10.

We are now going to attach guy wires to their anchor plates using turnbuckle assemblies. Unthread each turnbuckle to about 80% of maximum. Repeat steps five and six to loop guy wire through the turnbuckle eye, using a thimble and two wire saddles and tightening with an 11 mm socket.



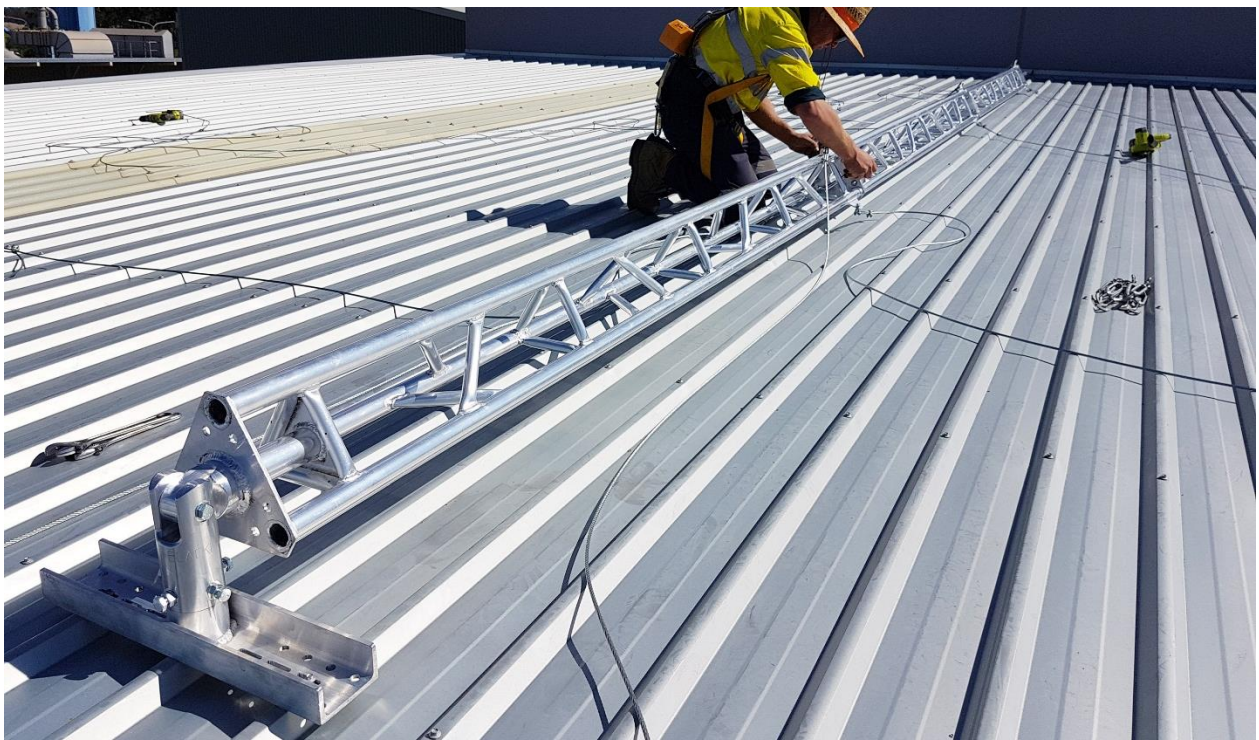
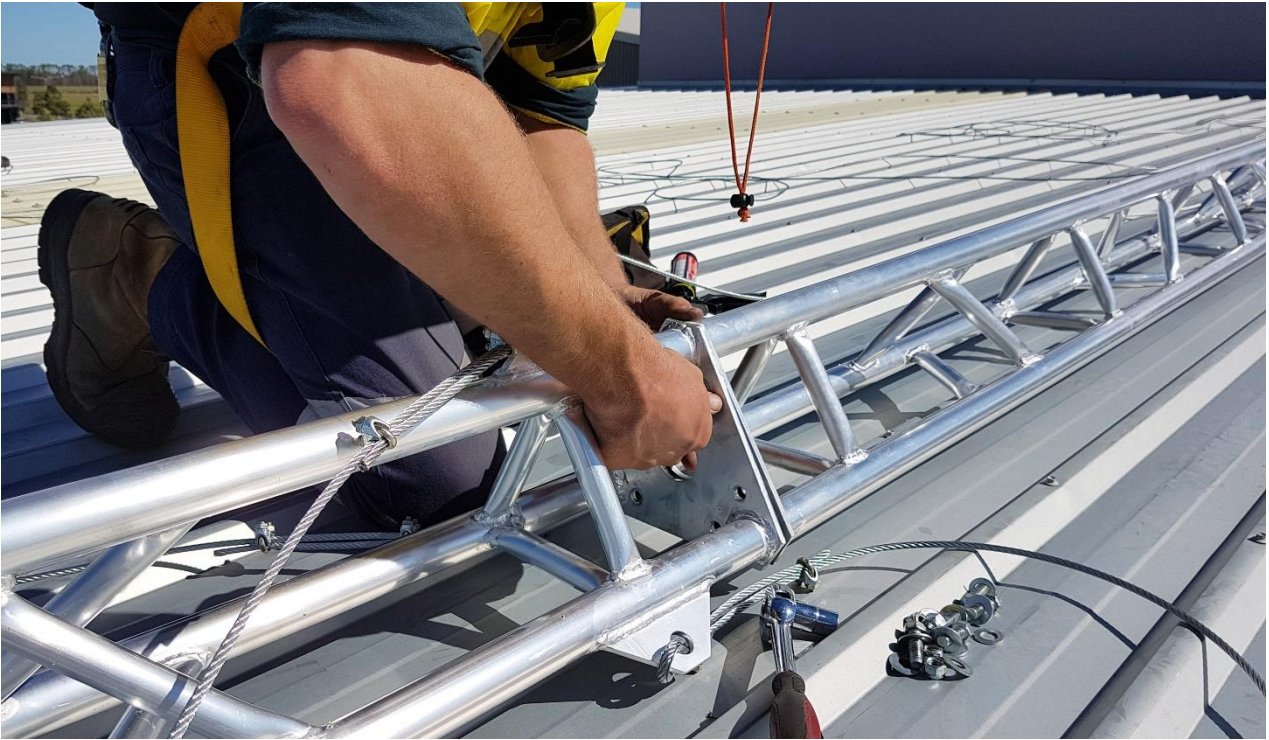
Step 11.

Once guy wires are taut, loosen and detach only the front guy wire from its anchor plate and lower tower back down for assembly of the remaining sections. **IMPORTANT:** Ensure the rear two guy wires stay attached.



Step 12.

Attach each AL210 module section using six 7/16" bolts and nylock nuts and two shifters. Alternate tightening to ensure equal tightness of each bolt and sections properly align. Repeat this process to attach the spigot or headframe.



Step 13.

Prior to lifting you may wish to attach the outer three guy anchor plates. In this example we are attaching our six metre guys to our inner anchor plates so this is not necessary. Ensure the rear guy wires remain attached.

Lifting is the most safety critical step – do not attempt if you are not appropriately qualified. While the tower is lightweight aluminium the lift becomes increasingly more difficult as you move towards the centre. It is advisable to have a third team member assist the lift by pulling from the front. Larger towers require a gin pole and winch assembly, very large towers may require a crane to complete the lift. Use your professional judgement and always be safety conscious.



Step 14.

As the rear guy wires are attached, one team member should now attach the front guy wire to its anchor plate. Tighten the M12 hinge bolt (vertical axis) on the multi-axis base using an 18 mm spanner / shifter. The tower should now safely remain upright under stable weather conditions – again, always err on the side of caution and use professional judgement.



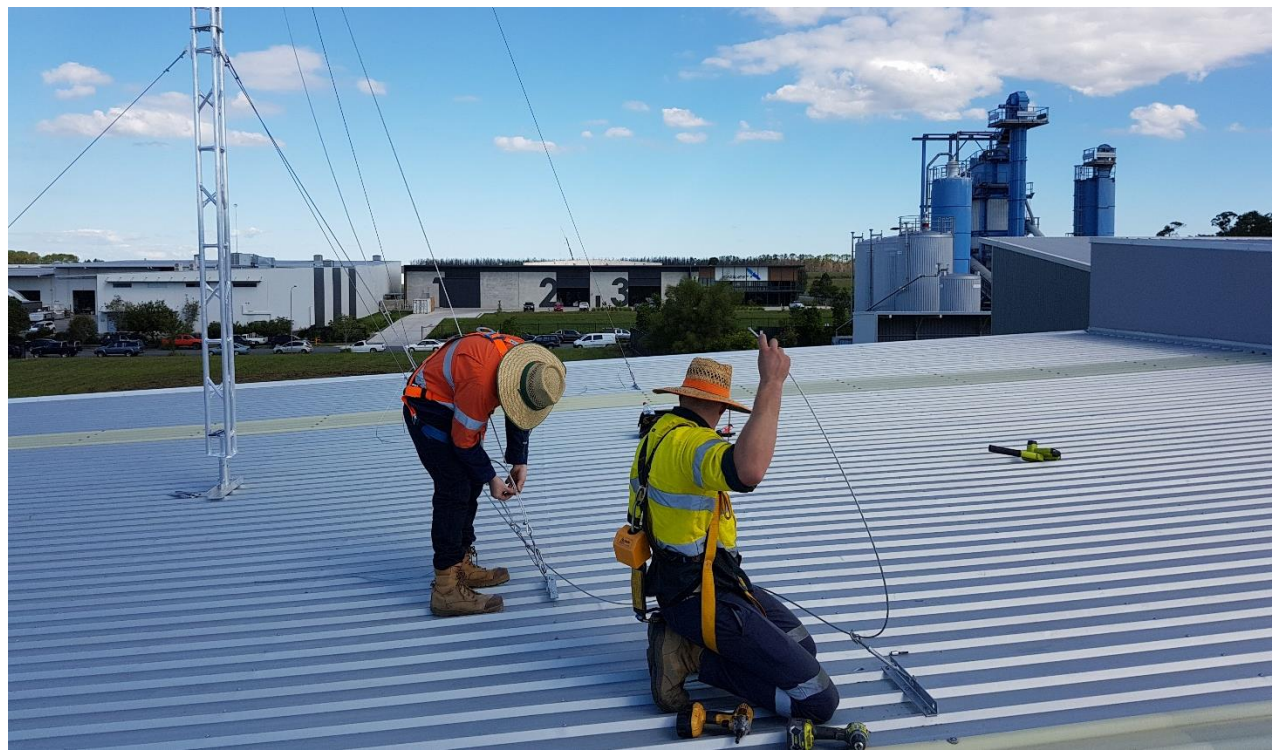
Step 15.

Repeat step 10 to attach six metre guy wires to the inner anchor plates using turnbuckle assemblies. Tighten turnbuckles until guy wires are taut. At this point you may wish to use a level to perform adjustments.



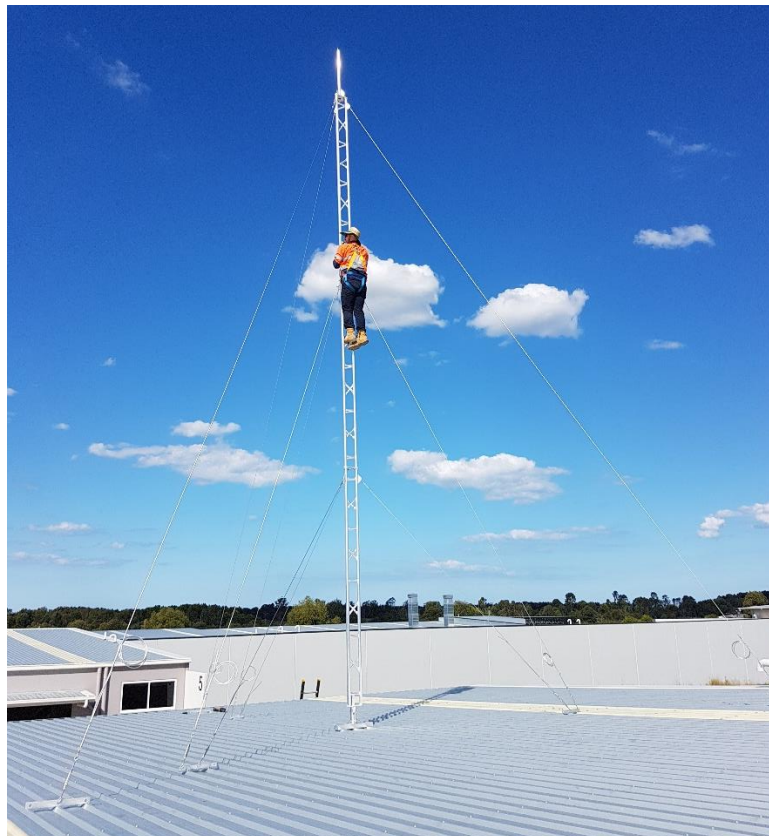
Step 16.

If the outer three guy anchor plates have not been attached, ensure they're installed now. Repeat step 10 to attach turnbuckle assemblies to the nine metre guy wires.



Step 17. – FINAL STEP

The tower is now fully installed. Adjust turnbuckles, using a spirit level to ensure tower remains straight. Larger towers may require measurement using a guy wire tensioner to ensure it meets engineering specification for its wind region. Tidy excess guy wire cabling and clean installation environment per your environmental policy.



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