

Task 2

Report

By

Anshul Singh

Research intern-Inspect

Aerial Inspection

Aerial Inspection is a process of inspecting various image data collected with the help of different types of UAVs/Drones and sensors at different places for better analysis and working of that field. Aerial inspection can provide information on many things not visible from ground.

Aerial Inspection is used in different fields such as:

1. Mining
2. Geographical Survey's
3. Self-Driving Cars
4. Agriculture
5. Large-Scale Area
6. Project Surveillance

Concept Used in Aerial Inspection:

The primary concepts that are used in aerial inspection are as follows:

1. UAVs
2. Image processing(for visual data)
3. Annotation
4. Computer Vision
5. Concepts of Machine learning
6. Data Analysis
7. Supervision system
8. Communication system

TOWER

Tower can be state as a building or a structure which is higher than its diameter and highly related to its surroundings that may be stand apart or stay together with a larger structure.

Telecom Tower

A cell tower, telecom tower or mobile mast is a structure equipped with antennae and other necessary electronics, transmitters, receivers and power sources needed to relay a mobile phone signal.

Types of Telecom Tower

- 1 Cell on wheel
- 2 Monopole
- 3 Roof Top Tower
- 4 Roof Top Pole
- 5 Wall Mount
- 6 Ground Based Tower(GBT)

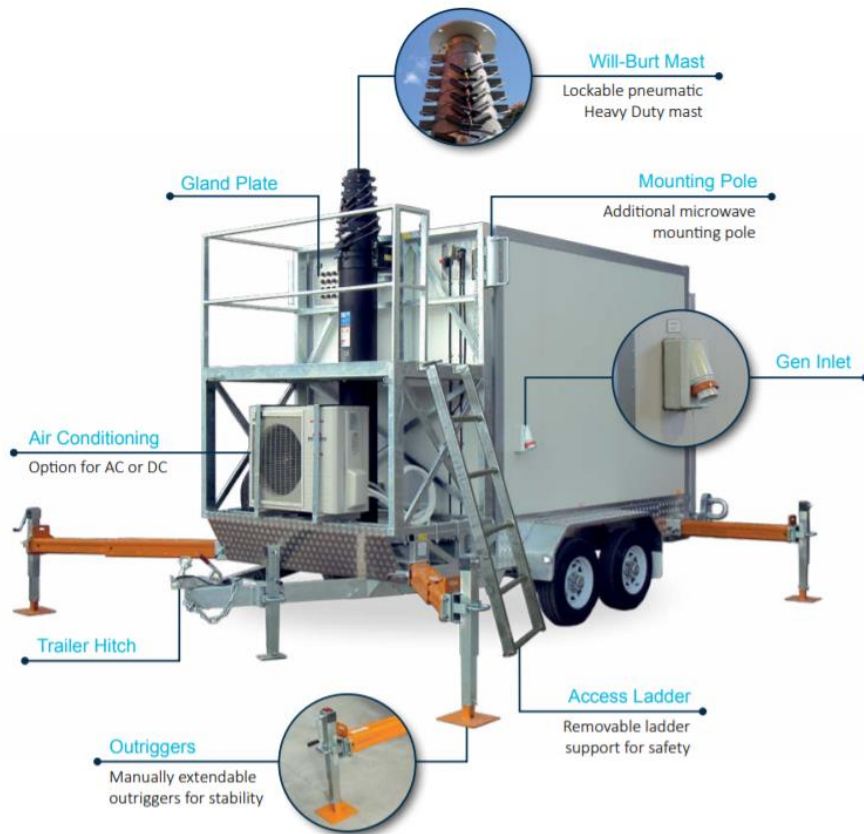
1. Cell on wheel :

The Cell on Wheels (COW) is a portable base station used to provide temporary cellular network coverage for high-profile events and emergency situations where existing base stations become damaged, or during natural disasters such as bushfires and floods. The COW was originally designed for telecom industry as a rapid solution in case of emergency. It can be transported to a large area and on a rough terrain.

Features

1. Fully engineered trailer base frame, dual axle
2. Outriggers and manual jacks
3. Road registrable trailer
4. AC/DC air conditioning system
5. Electronic and emergency brakes
6. Access platform and ladder
7. Tray – ways for easy cabling to equipment





Typical Cells on wheels

2. Monopole:

Monopole Tower is a kind of tower that consists of one stem or one pole anchored to the ground.

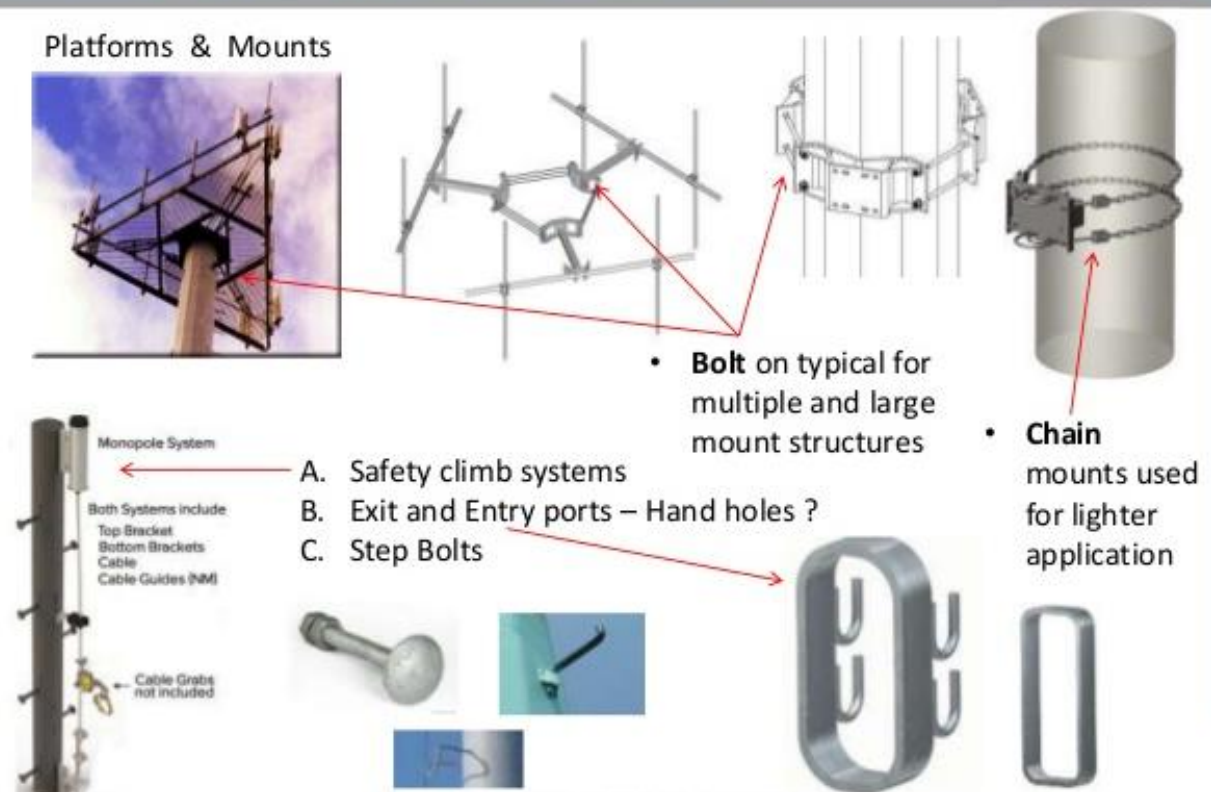


With the footprint of less than 50 square feet, monopoles are perfect for small sites.

Other advantage includes:

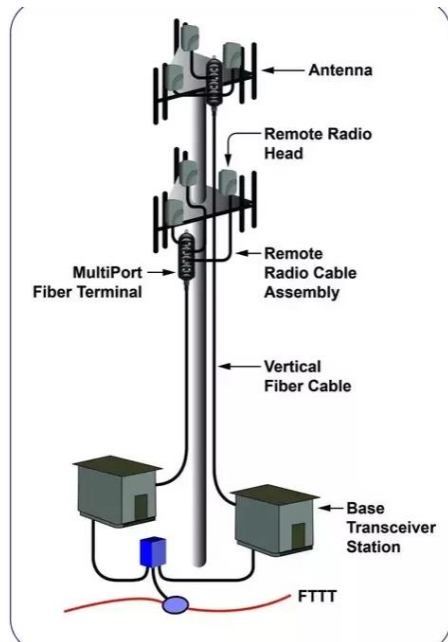
- 1 Easy assembly
- 2 Less expensive installation
- 3 Interior routing of cables which reduces wind loading
- 4 Can be designed for multiple carrier plus microwave capability
- 5 Platforms and antenna arrays can be rotated to any azimuth

Monopole Basic Parts & Accessories



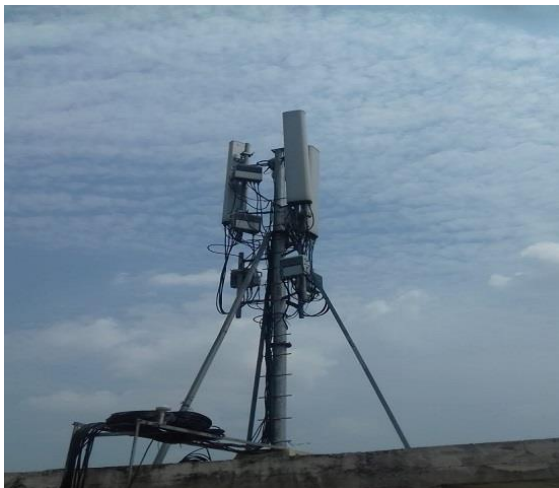
3. Roof To Top:

The base width of minimum dimension since the structure is roof mounted. The base of the tower is mounted on concrete or steel frame (consists of I-beams or inverted I-beams) with the frame fixed on the rooftop existing concrete columns/pedestals.



4. Roof Top Pole:

Roof Top Poles are installed on high rise buildings to cover the Network Coverage in the highly populated areas. These are available from 6 to 12 meters height. RTPs are required for Speedy and Smooth Network Coverage in the Dense/High populated areas.



5. Wall Mount Tower:

Wall mount towers are those tower which are mounted on the top of the building without a pole or any other support. This is basically installed on the buildings which are very high like in big cities.



6. Ground Based Tower(GBT):

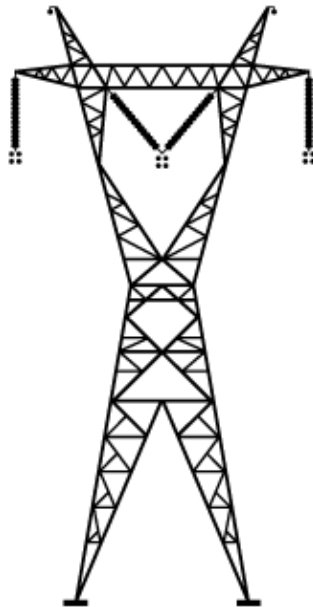
Ground based towers are erected on the ground with a height of 40 meters to 80 meters. These ground based towers are mostly installed in rural and semi-urban areas because of the easy availability of land.

GBT's can be further classified into many types:

1. Waist-type tower
2. Double circuit Tower
3. Guyed Tower
4. Tublar steel pole
5. Guyed cross-rope suspension tower
6. Crossing

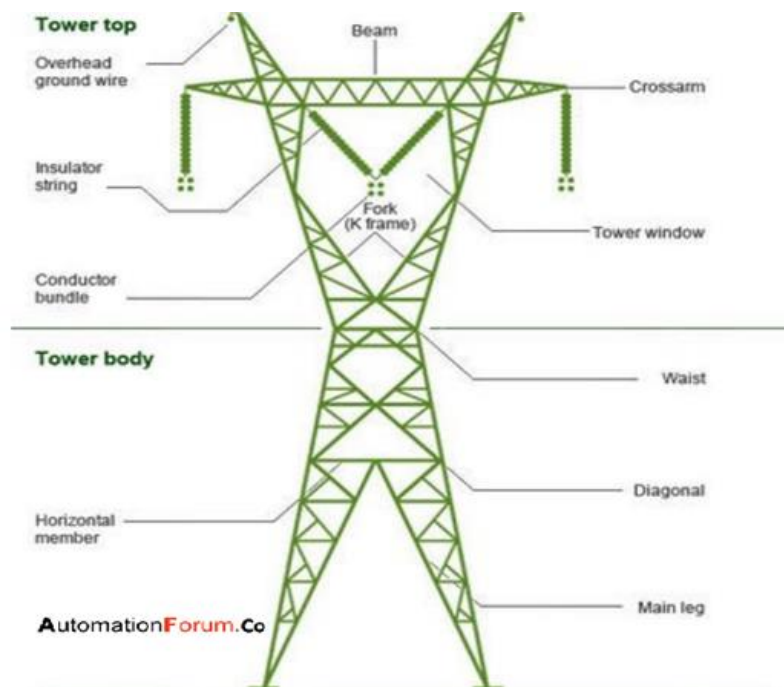
1. Waist-type tower :

This is the most common type of transmission tower. It's used for voltages ranging from 110 to 735 kV. Because they're easily assembled, these towers are suitable for power lines that cross very uneven terrain.



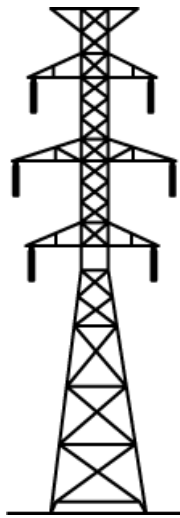
Components:

The components of waist type tower can be seen in image below:



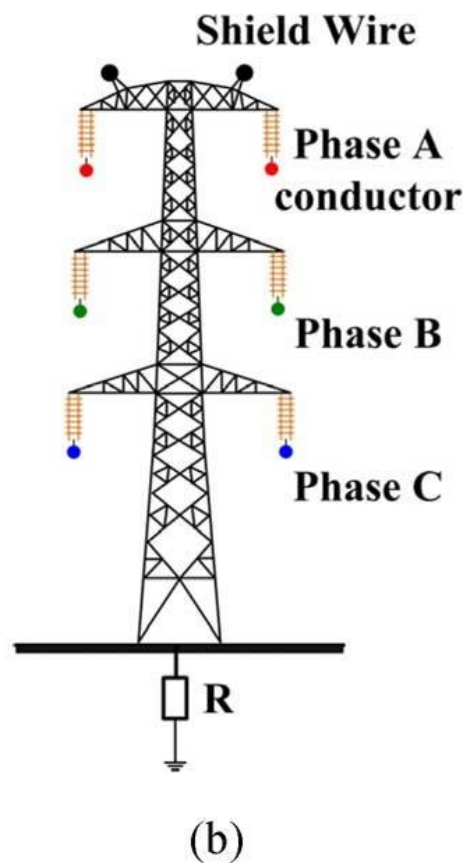
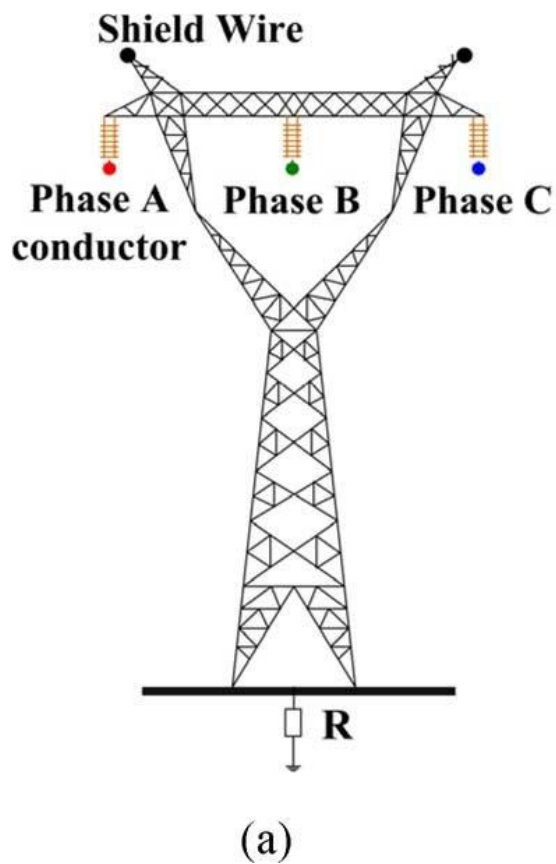
2. Double-circuit tower

This small-footprint tower is used for voltages ranging from 110 to 315 kV. Its height ranges from 25 to 60 metres.



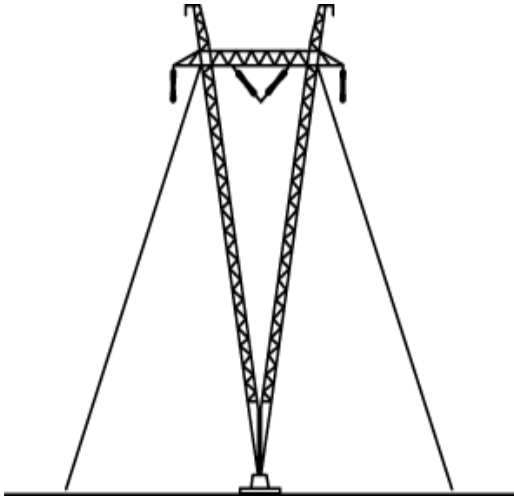
Components:

The components of waist type tower can be seen in image below:



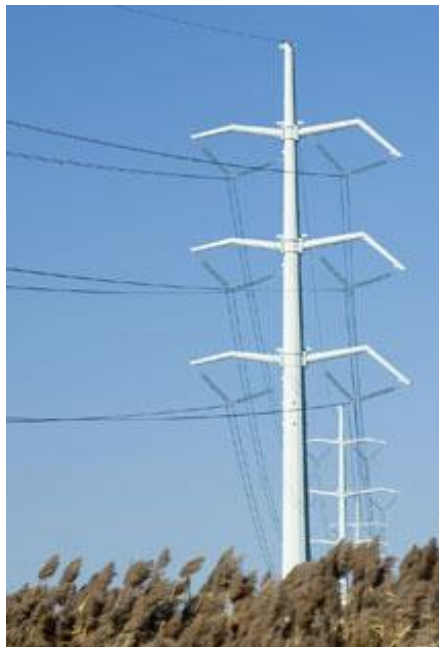
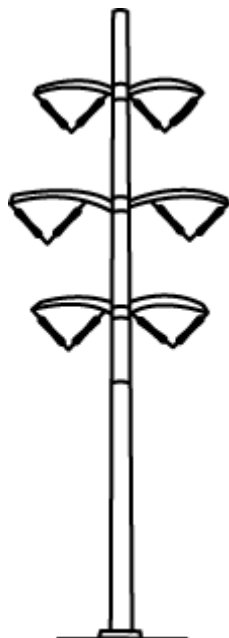
3. Guyed-V tower

This tower is designed for voltages ranging from 230 to 735 kV. It's used mainly for power lines leaving the La Grande and Manic-Outardes hydroelectric complexes. The guyed-V tower is more economical than the double-circuit and waist-type towers.



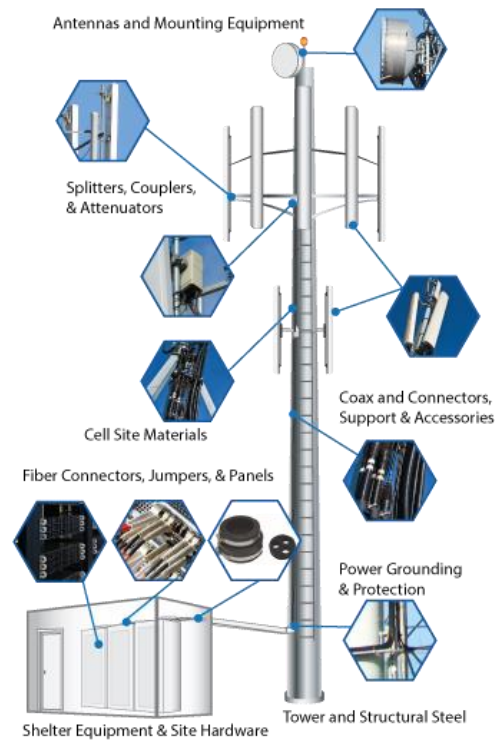
4. Tublar steel pole:

Featuring a streamlined, aesthetic shape, this structure is less massive than other towers, allowing it to blend easily into the environment. For this reason, it's being used more and more in urban centers.



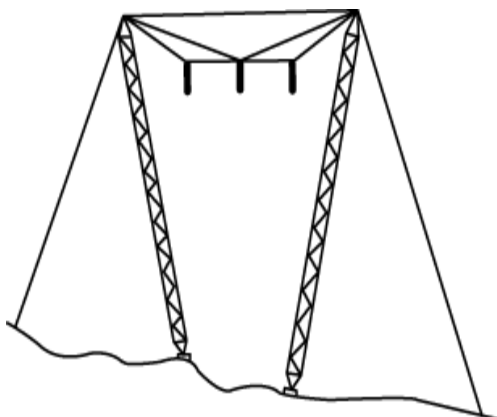
Components:

The components of waist type tower can be seen in image below:



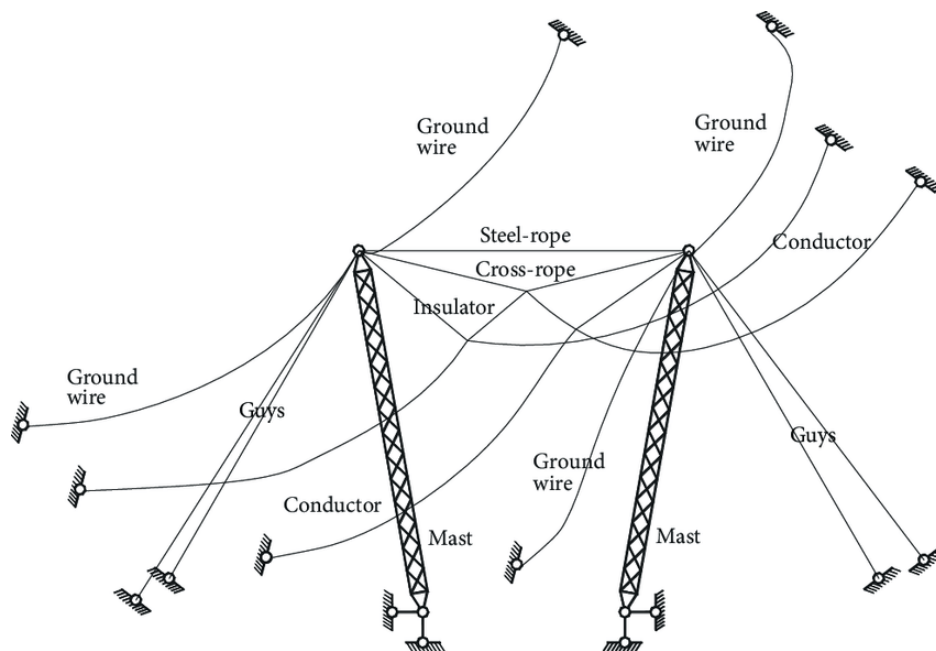
5. Guyed cross-robe suspension tower:

With its simple design, this tower is easy to assemble. It's used on some sections of power lines leaving the La Grande complex and supports 735-kV conductors. This type of structure requires less galvanized steel than the guyed-V tower, making it lighter and less costly.



Components:

The components of waist type tower can be seen in image below:



6. Crossing

Used when overhead power lines must cross large water bodies.



Tower Inspection with drone

Communication companies with cell and radio towers, cities with electric towers, and other industries that use towers as part of their daily operations—all of these towers require regular maintenance, and before the maintenance work can be done, a preliminary survey must be conducted to determine where to work.

- In tower surveys, a drone can help identify potential climbing hazards, find structural damage, and help tower inspectors understand the tools they need prior to climbing.
- Once this information has been gathered, a tower inspector can follow up and address the issues revealed in the data, if any.
- Drone surveys serve to reduce the amount of time personnel are on the tower, increasing their efficiency and keeping them safe.

Things to be inspected in Tower during inspection:

- The ground, such as ground movement or erosion
- Power lines, such as hot-spots or indicators of corona discharge
- Transmission towers, such as corrosion, broken components, and foreign objects on the tower
- Surrounding vegetation, such as tree growth rate and areas of vegetation encroachment
- Others ,such as unauthorized debris and construction activity

USE CASES

- We have to check for environmental or other hazard before climbing. The hazards could be bees, birds, structural damage etc.
- We have to identify damaged areas
- Pre work inspection helps to determine the tools and parts which are required for the fixing of the tower. This avoids the time which is wasted by returning to ground to find the best tool
- In case of structural emergency, we can investigate the structure's integrity before we climb.
- We can check whether it is safe to climb or not

Hazards/risks while doing tower inspection:

Telecommunications towers, for example those used for cell phone communication as well as electric tower, require regular and thorough inspection and maintenance. While necessary, these inspections carry a high level of risk, particularly to inspectors who must scale these towers to gather the necessary data.

Some of the risks are:

- 1 Falling from height risk
- 2 Electric shock risk
- 3 Unwanted weather changes risk
- 4 Equipment failure
- 5 Structural collapse