

Describe the various components of a pneumatic caisson with a neat sketch. Enumerate the advantage and disadvantages of pneumatic caisson.

A pneumatic caisson is a large watertight box-like structure made of steel or reinforced concrete, used as a foundation for large structures such as bridges, dams, or towers. It is sunk into the ground or riverbed by controlled excavation, often under compressed air, and then filled with concrete to provide a solid foundation. The main components of a pneumatic caisson are as follows:

1. **Cutting edge:** The cutting edge is the bottom part of the caisson that is in contact with the soil or rock, and is designed to cut through it as the caisson is lowered.

Get all solution at [BIHARENGINEERINGUNIVERSITY.COM](http://BIHARENGINEERINGUNIVERSITY.COM)

2. **Shaft:** The shaft is the vertical part of the caisson that extends above the cutting edge. It is made of steel or reinforced concrete and is used to house the working chamber and the airlocks.

3. **Working chamber:** The working chamber is the space inside the

shaft where workers operate and excavate the soil. It is a pressurized environment filled with compressed air to keep water and soil out.

4. Airlocks: Airlocks are used to transfer workers and materials in and out of the working chamber without losing compressed air.

There are typically two airlocks, one for workers and one for materials.

5. Compressed air supply: A compressor supplies compressed air to the caisson to maintain the working chamber pressure.

Advantages of pneumatic caissons:

1. Pneumatic caissons can be used in deep water or soft soil conditions where other types of foundation may not be feasible.

2. They can be used to support large structures that require deep foundations, such as bridges and skyscrapers.

3. The pressurized working chamber provides a safe environment for workers to operate in.

Pneumatic caissons can be sunk quickly, reducing construction time.

Advantages of pneumatic caissons:

The high pressure and compressed air used in pneumatic caissons can be dangerous for workers if not properly managed.

Pneumatic caissons can be expensive to construct, especially in deep water or soft soil conditions.

The compressed air can cause problems with soil stability, leading to settlement and other issues.

Environmental concerns can arise from the noise, vibration, and disturbance of marine life during construction.

Overall, pneumatic caissons are a specialized foundation technique that can be very effective in the right conditions, but require careful planning and management to ensure safety and success.