Presentation

on

“well foundation”

introduction

- Well foundation is the most commonly adopted foundation for major bridges in India. Since then many major bridges across wide rivers have been founded on wells.

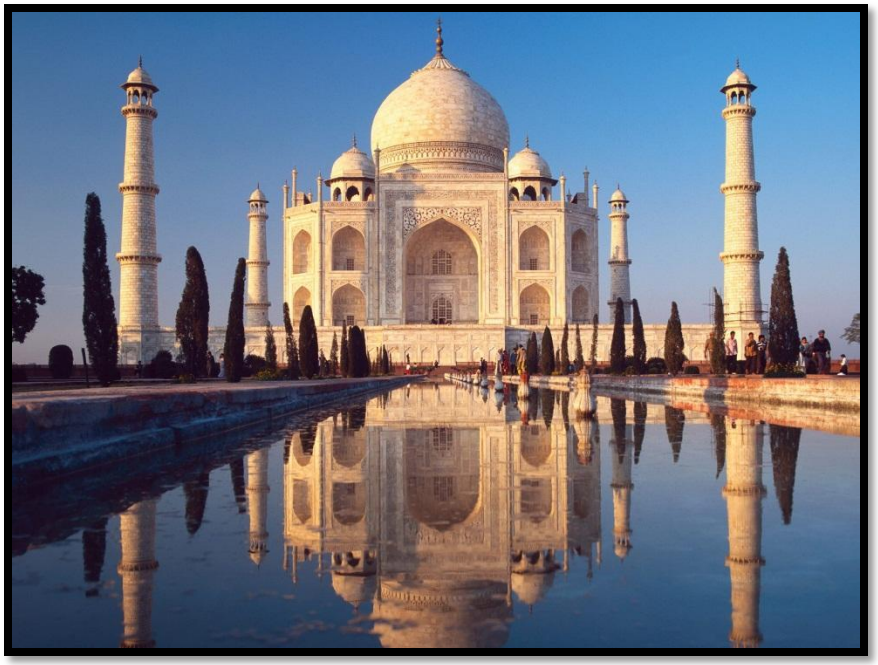
- Well foundation is preferable to pile foundation when foundation has to resist large lateral forces.

Introduction

- The construction principles of well foundation are similar to the conventional wells sunk for underground water.
- But relatively rigid and engineering behaviour.

Introduction

- Well foundations have been used in India for centuries.
- The famous Taj Mahal at Agra stands on well foundation.



Objectives

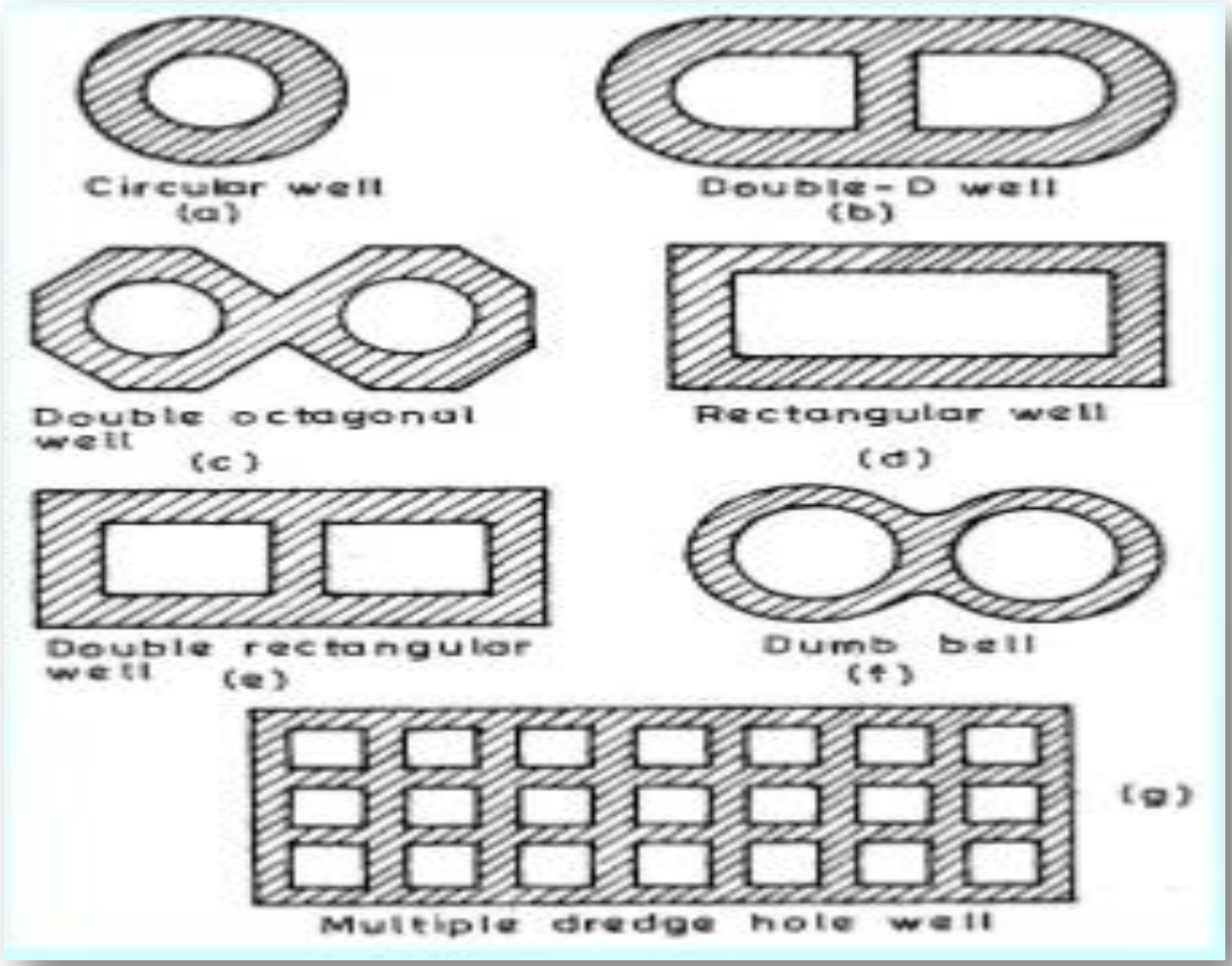
- To know the construction of well foundation.
- To know the different types and shapes of well foundations.
- To know which type of well foundation is suitable for different types of soil strata.

Shapes of well foundations

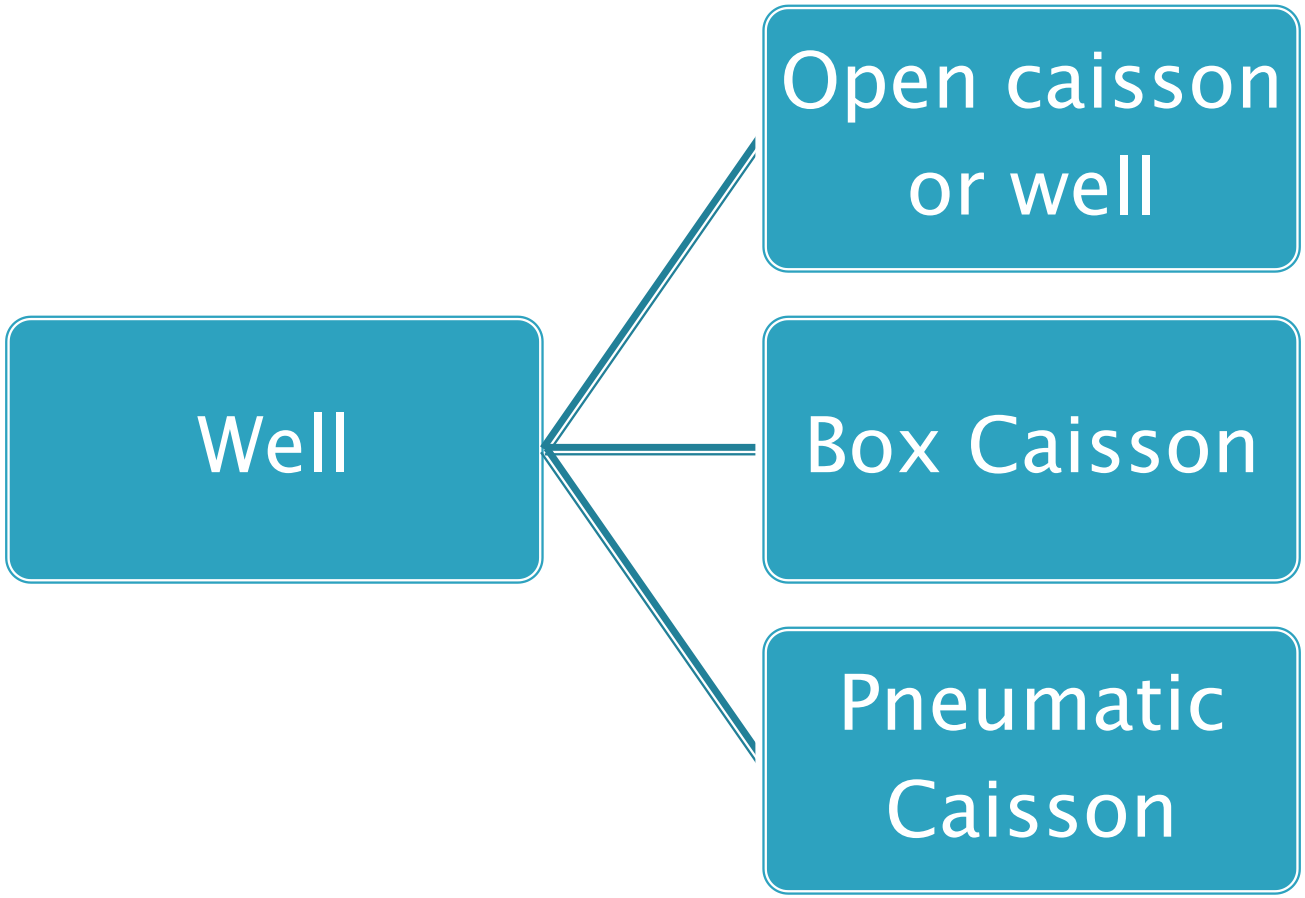
- Wells have different shapes and accordingly they are named as:-

1. Circular well,
2. Double D well,
3. Twin circular well,
4. Double octagonal well,
5. Rectangular well.

Shapes of well foundation



types of well foundation



Types of well foundation:-

- **Open caisson or well**: The top and bottom of the caisson is open during construction. It may have any shape in plan.

- **Box caisson**: It is open at the top but closed at the bottom.

- **Pneumatic caisson**: It has a working chamber at the bottom of the caisson which is kept dry by forcing out water under pressure, thus permitting excavation under dry conditions.

Open caisson

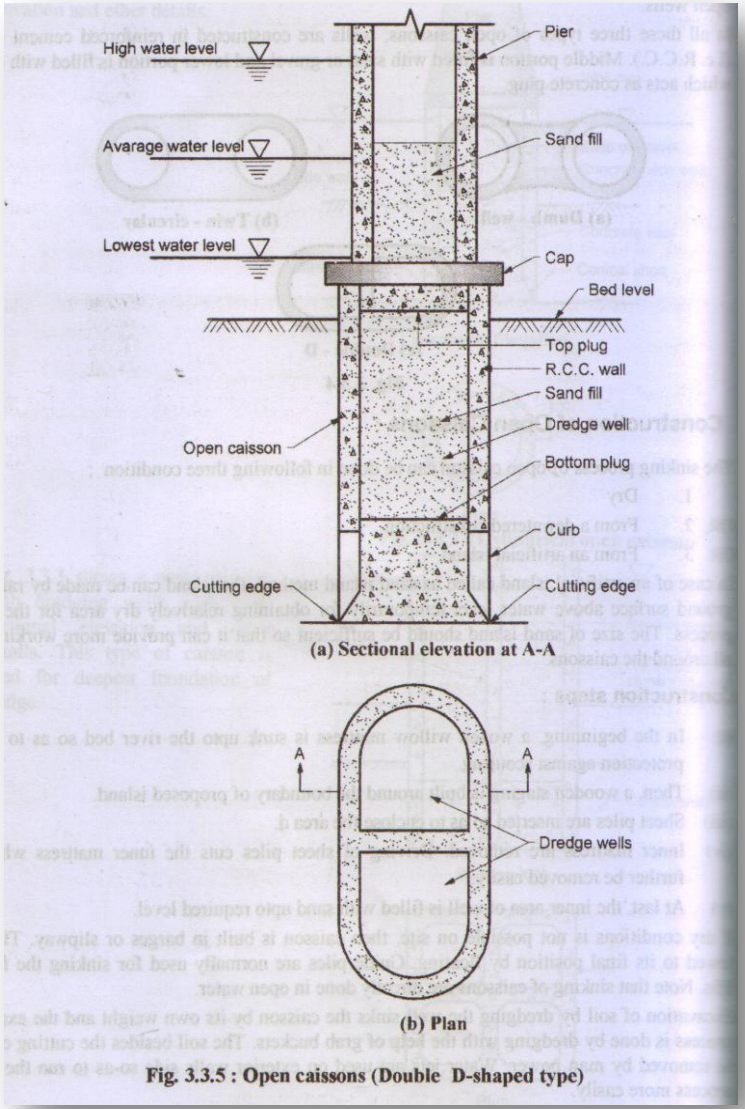
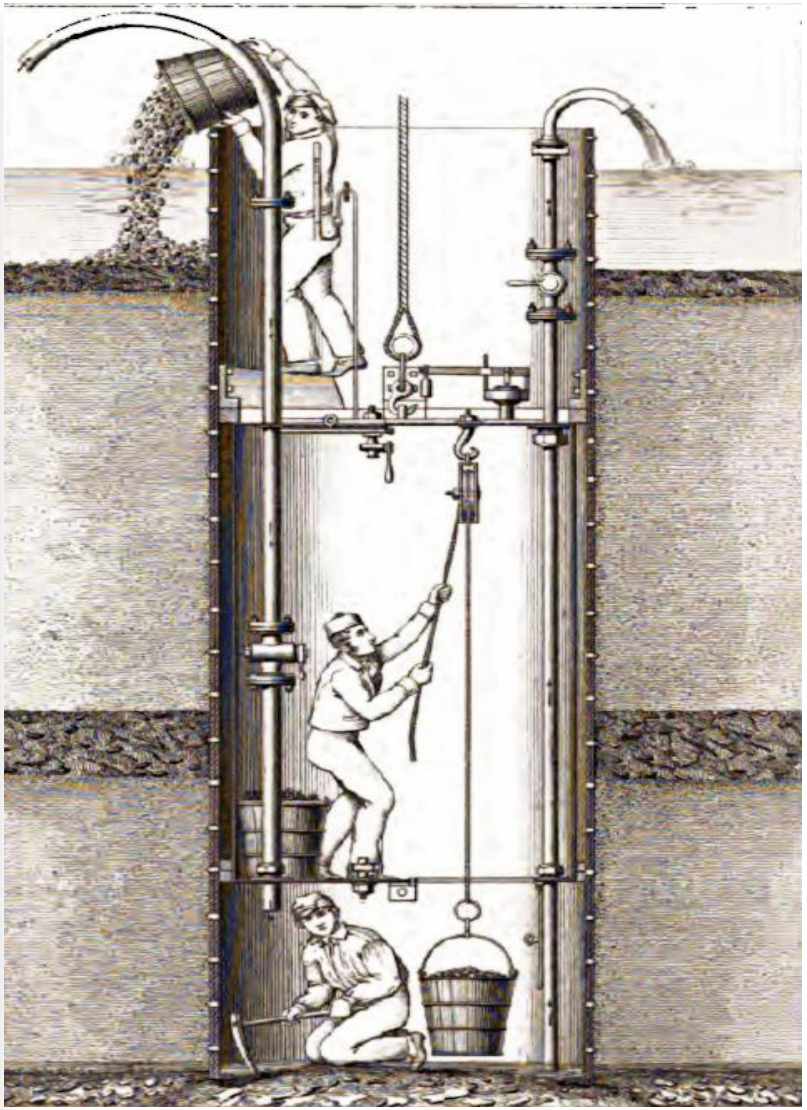
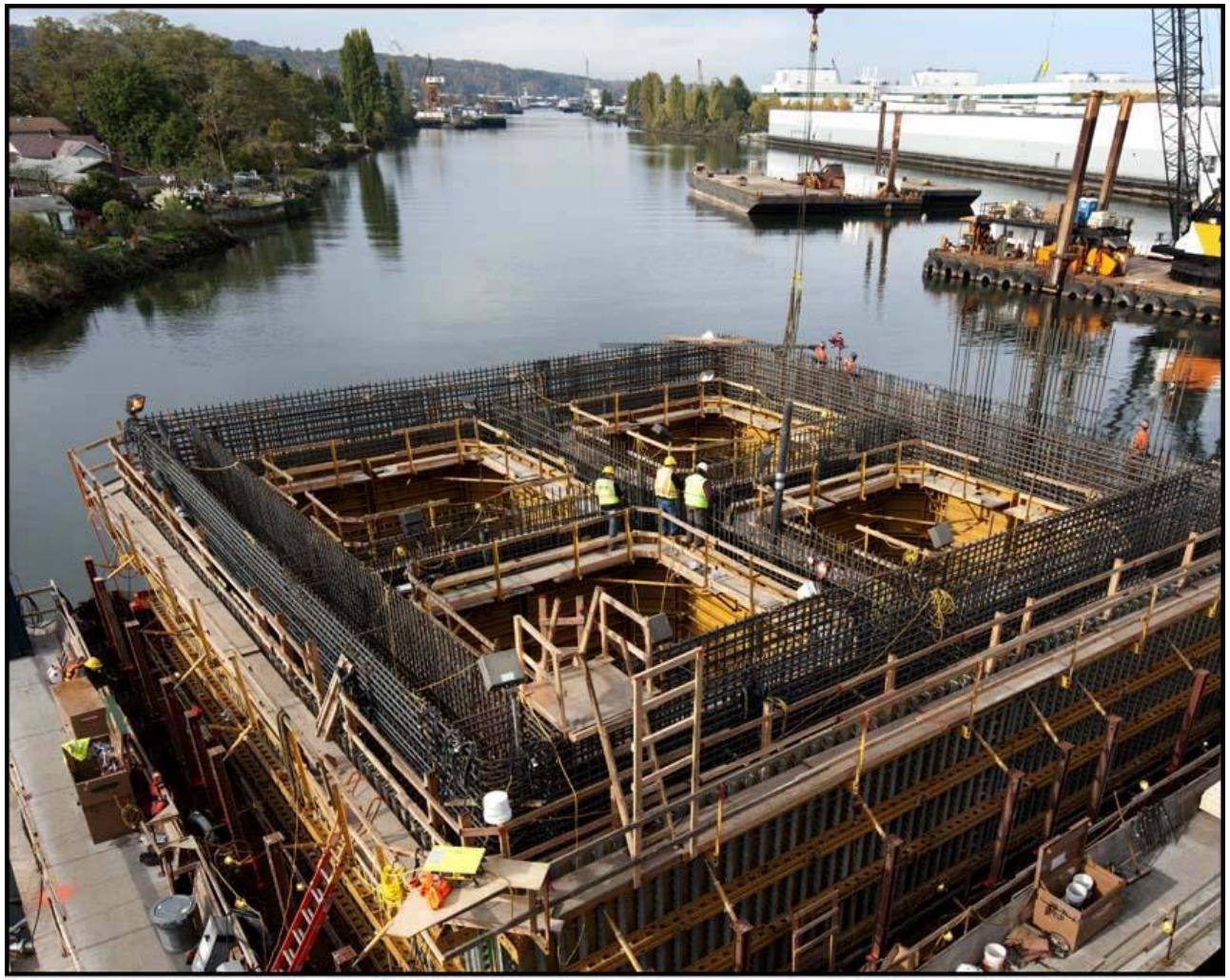


Fig. 3.3.5 : Open caissons (Double D-shaped type)



Open caisson

Open caisson



2011-11.2_0310+311 First walls in Pier 3 caisson are ready to be poured. photo: John Stamets

Box caisson

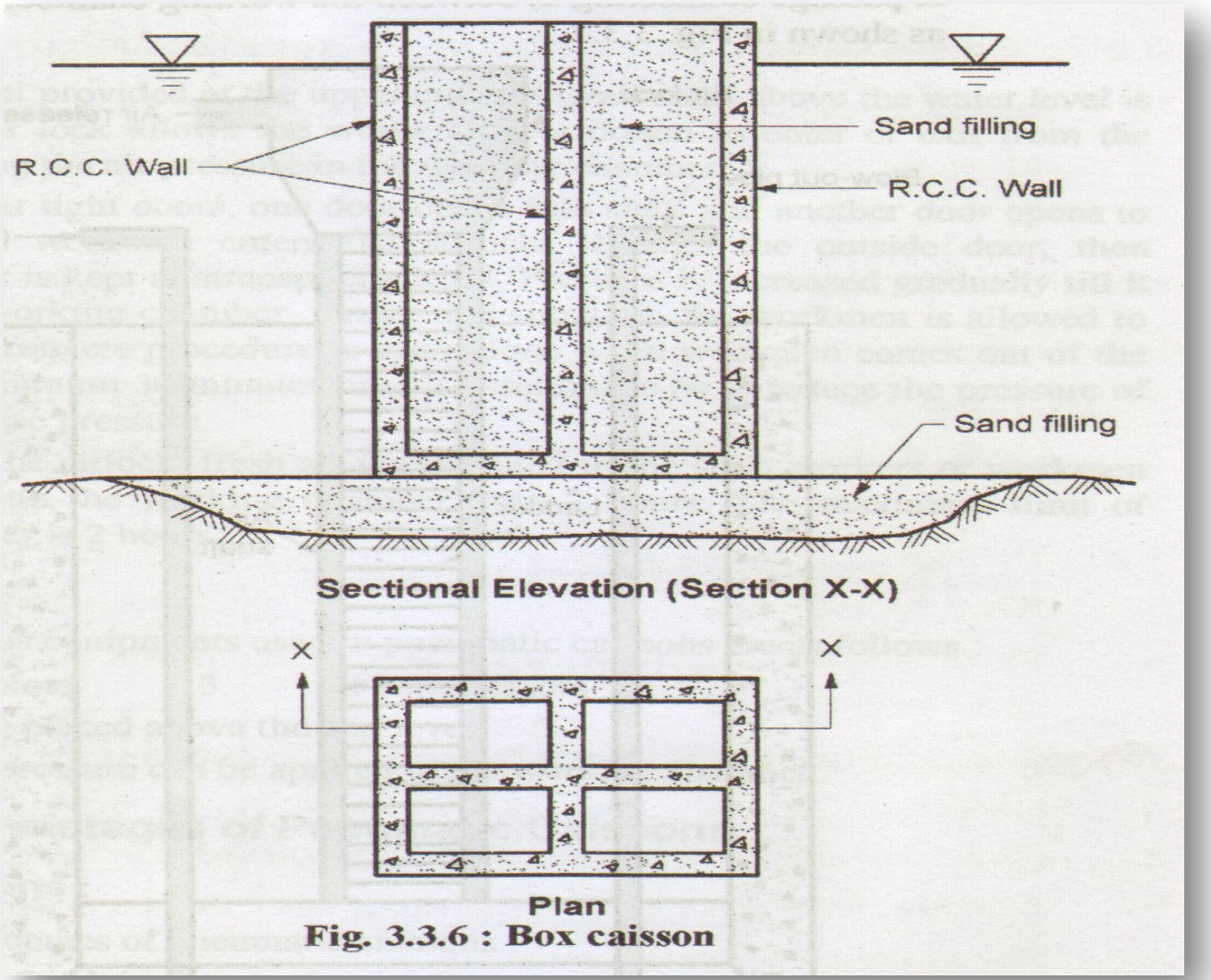
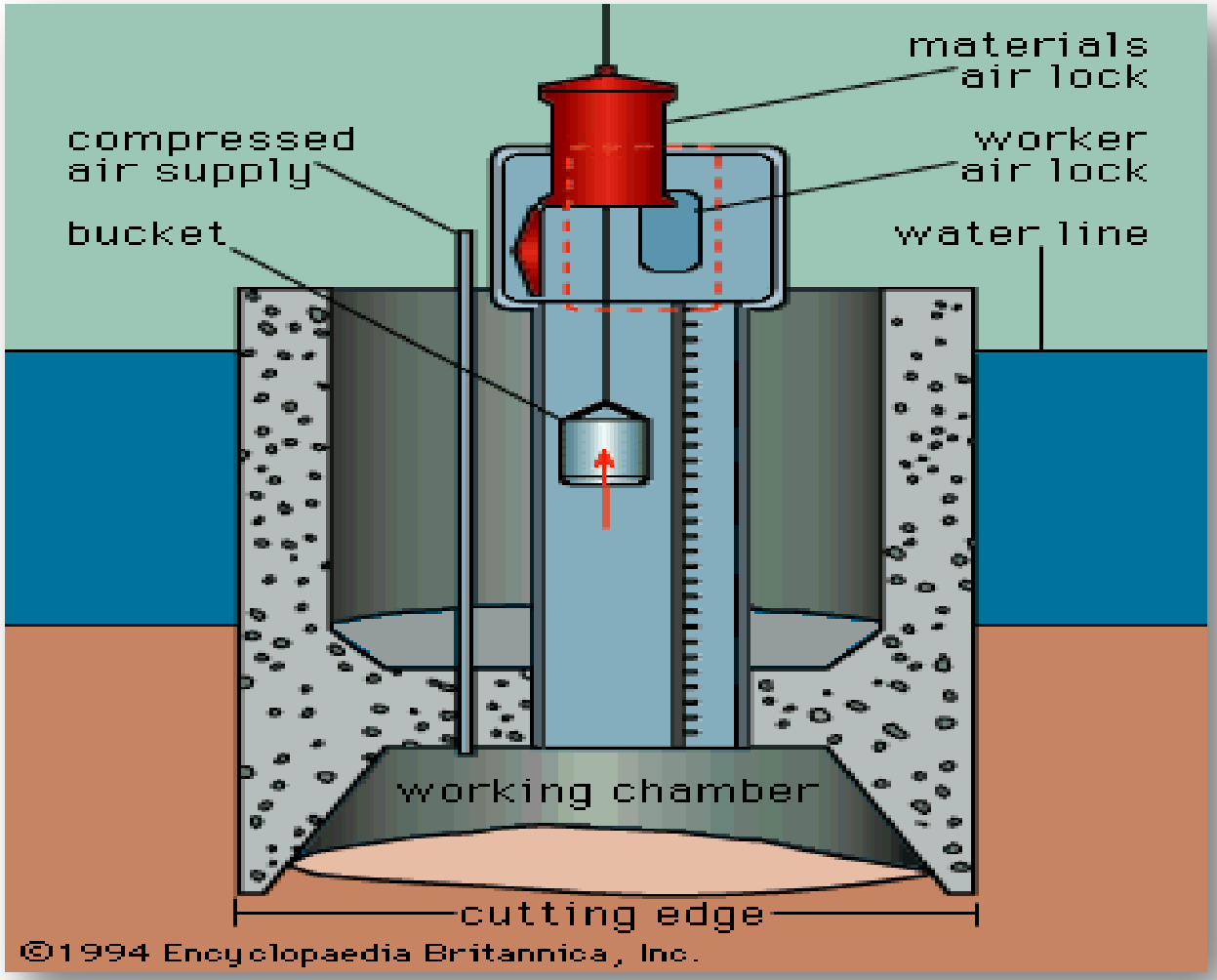


Fig. 3.3.6 : Box caisson

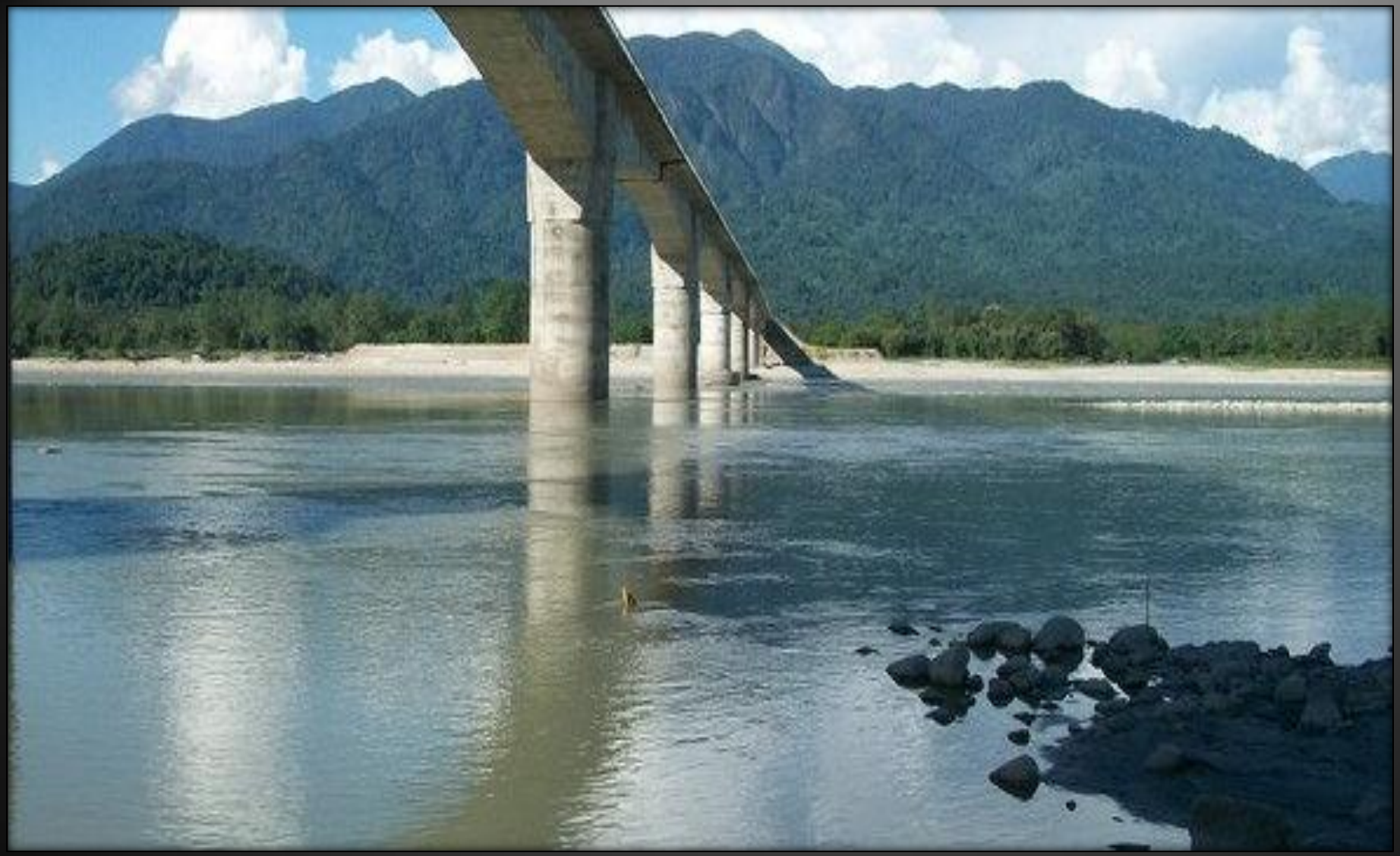
Box caisson

Pneumatic caissons



---Case study---

Well foundation construction in bouldery bed strata



Pasighat Bridge

Andhra Pradesh

IMPORTANT FEATURES OF THE BRIDGE

The Important Factors of the bridge were as follows..

- Length of the bridge - 704 mts.

- Foundation:-

i. Type -Circular Well.
ii. Outer Diameter -11.7 mtrs.
iii. Inner Dia. -6.64 mtrs
iv. Steining thickness -2.53 mtrs.
v. Well curb height -4.5 mtrs.
vi. Angle of cutting edge -33 degrees.
vii. Grade for steining concrte -M25

Pasighat Bridge

Boulder dredged during well sinking

Construction methodology

- The construction in flowing water was carried out by means of heavy machinery like dozers , dump trucks and excavators , etc.
- Pneumatic sinking and conventional sinking method is adopted for construction purpose.
- Sand was taken from the river and cleaned before transportation and then is used as sand filling.

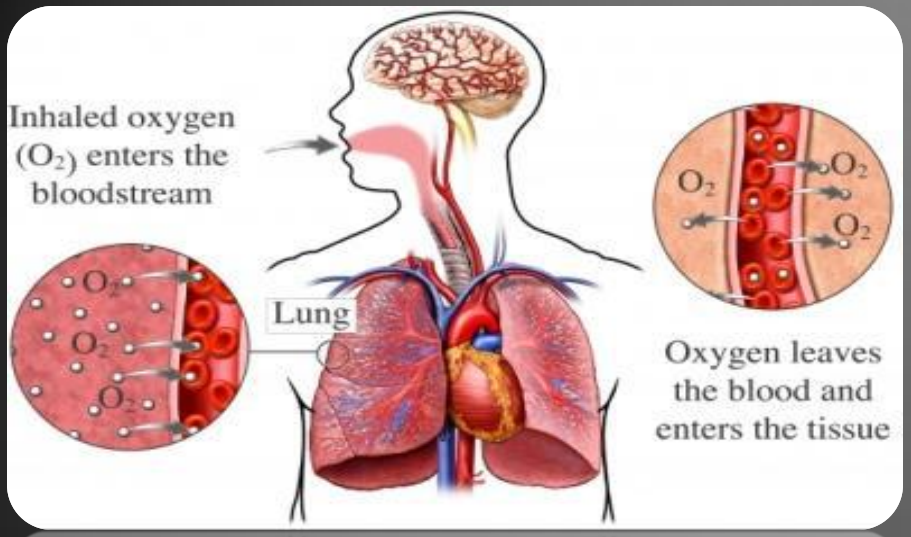
Construction problems

1. The sinking of the well becames very difficult due to the presence of large size of boulders in the strata.
2. Basically there were difficulties in finally deciding the foundation level on such strata.
3. Due to heavy rainfall in the area a considrably reduced working period was available in the region.

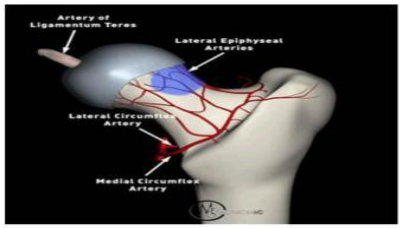
Caisson disease

- In case of sinking process of pneumatic caisson , workers under pressure may suffer from “Decompression sickness”(Caisson disease).due to rapid change in pressure.

- Construction of the Brooklyn Bridge, which was built with the help of caissons, resulted in numerous workers being either killed or permanently injured by caisson disease during its construction, including the designer's son and Chief Engineer of the project.



Caisson Disease



conclusion

- Construction of a well foundation in bouldery bed strata calls for a dedicated effort on the part of the executives.
- The data of the soil strata encountered at the site must be kept in detail for each meter and if required a review of the foundation must be carried out , based on actual soil parameters obtained during sinking.