Methods of Placing Concrete Underwater

Assignment No.: 04.01

Assignment

With suitable diagrams briefly explain the two methods of placing concrete underwater described in class.

The two methods are:

1. Tremie method
2. Bottom opening method

Overview

Underwater concrete placing requires special considerations to prevent segregation, washout, and maintaining workability and concrete quality. The required two methods are described below.

Bottom opening method

In this method, concrete is loaded into a container called bottom dump bucket. This bottom dump bucket is lowered into the water to its placement position. Once it has reached the desired location, the bottom of the bucket is opened and the whole concrete is dumped slowly.

Advantages

- Simpler setup and the process is straight forward.
- Simple to operate with basic training.
- Equipment and operational costs are lower compared to the tremie method.

Limitations

- In this method, some of the concrete may wash away causing a reduction in concrete strength.

- It is prone to segregation and water entrapment in strong currents.
- Suitable for small to medium volumes.

Drawings

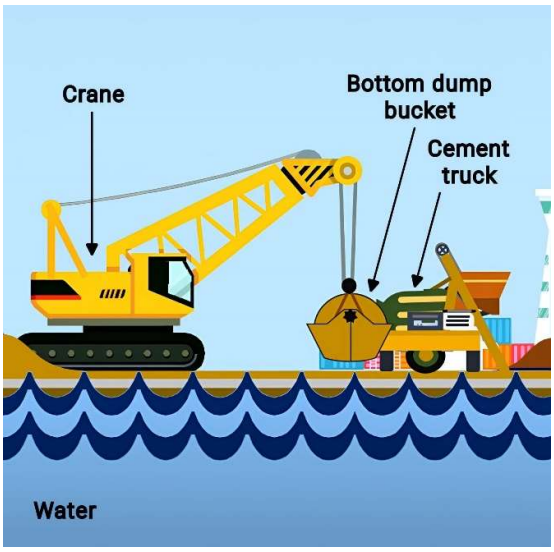


Figure 1: Simple setup of bottom opening method. Source: youtu.be/qsfQJLpPG4w

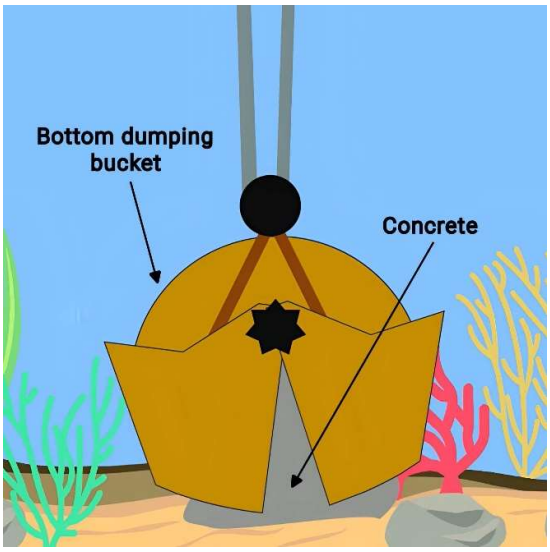


Figure 2: Opening of bottom dump bucket to dump concrete. Source: youtu.be/qsfQJLpPG4w

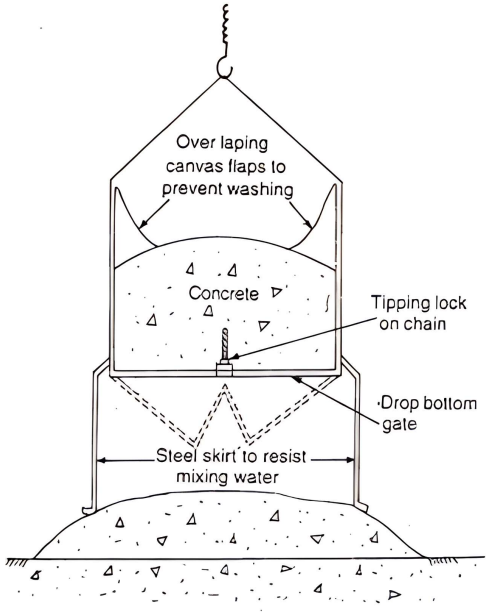


Figure 3: Diagram of bottom dump bucket highlighting various components. Source: constrofacilitator.com

Tremie method

This is a very popular method of placing concrete underwater that involves a hopper (funnel-like object) and a tremie pipe. The hopper is connected at the top of a tremie pipe which is aligned vertically and transports concrete directly to the placement site via gravity. The pipe is sealed at the bottom to prevent water from entering. A crane keeps the setup stable while concrete is poured into the hopper from a concrete truck. Afterwards the tremie pipe is gradually lifted as concrete gains required strength and gets discharged.

Advantages

- This method is very reliable.
- Prevents concrete segregation and washouts.
- Ensures continuous and uniform placement.
- Suitable for large-scale underwater concreting.

Limitations

- This method requires specialized equipment like tremie pipe and hopper.
- It is more expensive compared to the bottom opening method.

Drawings

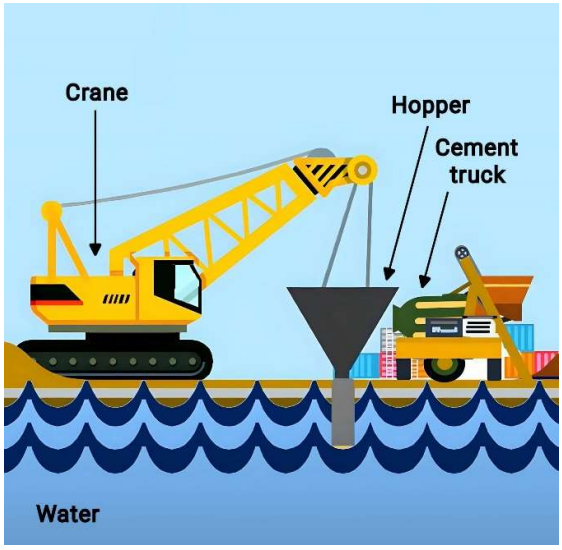


Figure 4: Setup of tremie method. Source: youtu.be/qsfQJLpPG4w

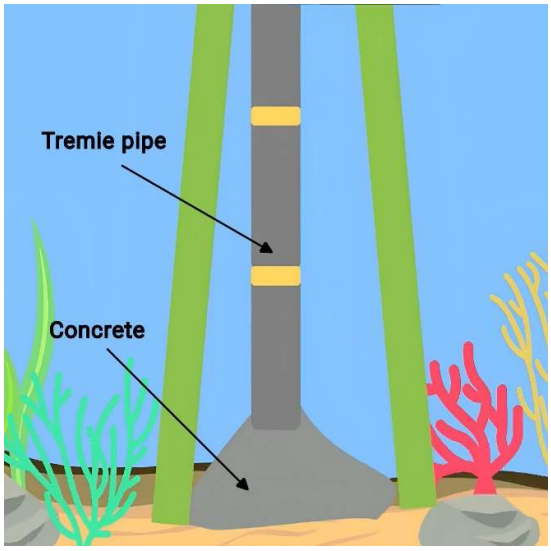


Figure 5: Discharge of concrete from tremie pipe. Source: youtu.be/qsfQJLpPG4w

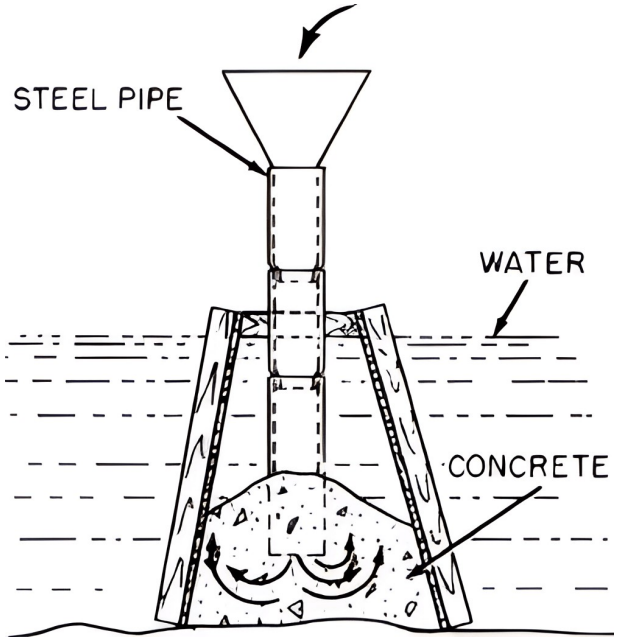


Figure 6: Schematic diagram of tremie method setup.
Source: foundationequipment.wordpress.com