CONCRETE TECHNOLOGY MODULE SEMESTER 1 – LECTURE 11

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SEMESTER 1 OUTLINE

Item	Subject	Item	
1	**Introduction: Cement and Aggregate**		
2	**Manufacturing of concrete** - Mixing - Transportation - Placing and compaction - Curing - Finishing	**4**	**Strength of Concrete** - Compressive strength - Tensile strength - Modulus of rupture - Bond strength with steel reinforcement - Factors affecting concrete strength - Factor affecting concrete test
3	**Properties of Fresh Concrete** - Workability and Consistency - Segregation and Bleeding - Pressure on form work - Stripping of form	**5**	**Deformation of Concrete** - Creep - Shrinkage - Modulus of elasticity and Poisson's ratio

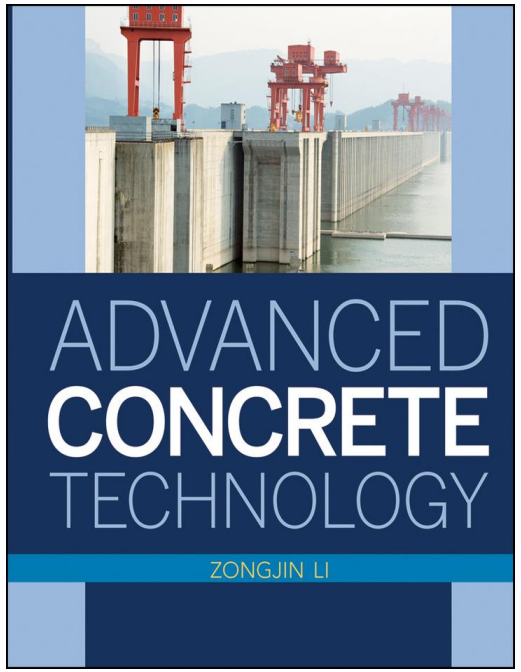
REFERENCES

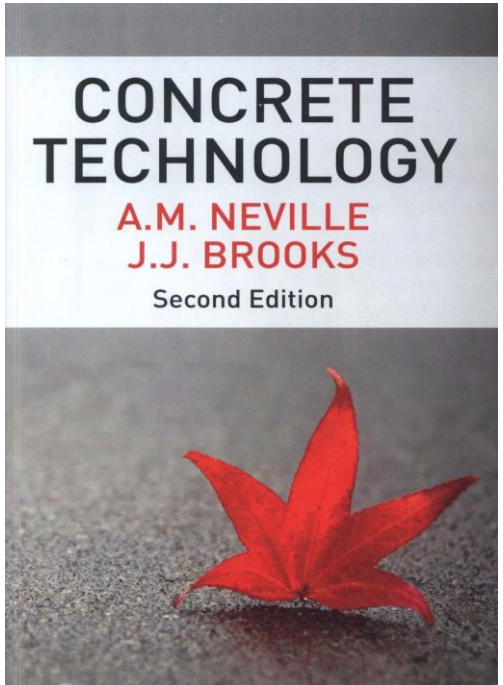
Main Reference

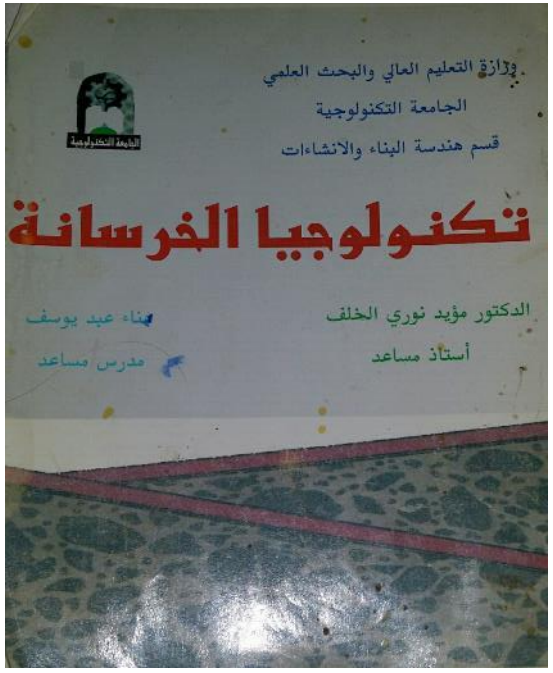
- Advanced concrete technology by Zongjin Li

Other references

- Concrete technology by Dr. Moaid Nory
- Concrete Technology -2dn Ed by A.M. NEVILLE







LECTURE CONTENTS

FRESH CONCRETE

1. 3.4 MANUFACTURE OF CONCRETE
2. 3.5 DELIVERY OF CONCRETE

3.4 MANUFACTURE OF CONCRETE

Nowadays, concretes are usually produced in two ways:

- **Manufactured in a commercial concrete plant, and**
- **produced on the construction site.**

The advantages of ready-mixed concrete are as follows:

(1) it provides concrete with better quality due to specialized operation;

(2) mass production;

(3) elimination of storage space for basic materials at site;

(4) basic materials can be fully utilized;

(5) it reduces the labour requirement;

(6) it reduces noise and dust pollution on the construction site; and

(7) it reduces the production cost of concrete.

ASTM C94 / C94 M-09a (Standard Specification for Ready-mixed Concrete) specifies the requirements for quality control of ready-mixed concrete **manufactured and delivered to a purchaser in a freshly mixed and unhardened state.**

Mixers will be stationary mixers or truck mixers.

Except as otherwise specifically permitted, cement, aggregate, and admixtures are measured by mass.

Nowadays, stationary mixers are usually used to produce wet concretes and are referred to as wet processing.

READY MIXED CONCRETE PLANTS

A dry process just discharges all the raw materials into a truck mixer and the mixing is finished in the truck on the way to the site.

The mixing capacity of a stationary type of drum mixer reaches 9 m3.

The pan mixer (see Figure) is usually utilized at the construction site, precast concrete plant, and laboratories. Mostly, it is for small amounts of concrete, as compared to a ready-mix concrete plant.

3.5 DELIVERY OF CONCRETE

The delivery of fresh concrete from the concrete plant to the construction site is usually done

by **agitators, either truck mixers or truck agitators.**

The truck is equipped with a rotating drum for agitation, shown in Figure below.

The truck mixer receives raw materials from the plant and completely mixes them into workable fresh concrete on the way to the construction site.

The advantage of truck mixing **is that the water can be stored separately and added into the solid materials for mixing according the time of shipping, to avoid slump loss.**

If the construction site is offshore, a ferry is used to carry a large number of trucks from land to the site (see Figure below).

In this case, due to a long shipping period, special care has to be paid to the slump loss.

Usually, retarding admixtures have to be used to keep concrete workable for a period of 5 to 6 h, and an initial setting time of 7 to 8 h.

In this case, A truck mixer has priority to be selected, if available.

FIGURE 3-13 DELIVERY OF CONCRETE BY TRUCK

FIGURE 3-14 DELIVERY OF CONCRETE TO AN OCEAN CONSTRUCTION SITE USING A FERRY


Thank you for
your
attention!