

# Concrete Technology Course

General Information



# 1 — Course Introduction

## A. COURSE INTRODUCTION

This course has been designed to provide experienced technical staff with detailed knowledge of concrete technology specific to the building and construction industry, enabling them to better service the concrete industry specifically and the building and construction industry generally.

The course structure and content have been developed to meet the needs of building and construction technical professionals, concrete managers, engineers, specifiers, graduates and those pursuing a technical career in the concrete materials industry.

CCAA engage highly experienced technical specialists from CCAA member companies and other industry areas as presenters, speakers and facilitators for this course. This ensures a practical, current and relevant course and a valuable knowledge sharing opportunity for all participants.

## B. PRE-REQUISITES

For those considering enrolling in the Concrete Technology Course, CCAA recommends prior completion of the Concrete Practice Course and/or a minimum of five (5) years relevant industry experience.

## C. LEARNING OUTCOMES

The learning objective of this course is to provide participants with a detailed understanding of concrete practice and technology specific to the building and construction industry. At the conclusion of the course participants will:

- Outlining key legislative requirements of Fire Ant Management in Queensland ('QLD').
- Have a detailed knowledge of the materials used in concrete including cement, supplementary cementitious materials, aggregates and chemical admixtures.
- Have a detailed knowledge of the properties of concrete and the things that affect them.
- Be able to produce a simple mix design and understand the things that impact on that design.
- Understand concrete production and specification requirements.
- Have knowledge of the major on-site operations of compacting, protection and curing of concrete.
- Understand the main forms of cracking in concrete and be able to identify them and their cause.
- Recognise the important elements in concrete placing and construction and have the knowledge to undertake investigations of problems.
- Have a detailed knowledge of the requirements for the production of special surface finish off-form concrete.
- Have a good understanding of the requirements for special paving finishes
- Understand in detail the test methods for concrete
- Have a general knowledge of the test method for cementitious materials and the reasons for the tests.
- Appreciate the difference between QA and QC and understand certain detailed QC requirements.
- Have knowledge of the requirements for problem investigation and the non-destructive testing (NDT) techniques that can assist in concrete-related investigations.
- Have gained experience in writing technical reports related to concrete problem-solving.

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## D. IMPORTANT COURSE INFORMATION

### Modules

This course comprises of 28 modules in total. The modules are grouped into 6 key blocks and have been developed in a logical sequence to assist with the understanding on concrete technology.

- Block 1:** Course Introduction
- Block 2:** Concrete Materials
- Block 3:** Producing and Testing Concrete
- Block 4:** Placing and Finishing Practices
- Block 5:** Speciality Concrete Applications
- Block 6:** Concrete Performance Characteristics

The modules contained within each of the blocks are listed at the end of this document.

### Course Duration

The course is delivered in two (2) blocks of three (3) days with a minimum of one month break between the blocks. During the break participants will be required to work on case study(ies), mix design(s) and arrange a visit to a construction materials laboratory.

### Learning Activities

To provide an opportunity to apply learnt knowledge and understanding, learning activities and questions are provided at the end of each module. Participants are encouraged to review and complete these at the end of each day. An understanding of them will ensure a good grasp of the key information presented during the course and which may provide participants with a good basis for completing the final examination at the end of the course.

### Course Requirements

Assessment requirements for this course involve three components:

1. Attendance and Participation  
Participant attendance will be recorded each day and will impact on final marks of the course. Each day of attendance is worth 1.5% of the overall course mark. Attendees sign in at the start of each day.

2. Reports on Case Study(ies), Laboratory Visit and Mix Design(s)  
Course activities, including case study(ies), mix design exercise(s) and laboratory visit requirements will be distributed during the first part of the course and participants are expected to complete their analysis of them during the course break and submit/present their findings during the second part of the course. Successful completion and submission of the reports is mandatory to gain a pass into the second part of the course.

3. Examination  
There will be an examination at the conclusion of the course. This will cover the main topics and the most important aspects from each module. This will be an open book examination and will comprise both multiple

## E. COURSE COMPLETION REQUIREMENTS AND RECOGNITION

The specific course completion includes two requirements:

- Examination mark: minimum 70%
- Total mark: minimum 70%

The total mark comprises the following components and weightings:

- Attendance and Participation (1.5% for each day of the 6 days): 9%
- All course activities/reports: 21%
- Examination: 70%
- Total: 100%

Upon successful completion of the course, participants will receive from CCAA a certificate which provides evidence of their successful completion of the course.

This course is a pre-requisite for those who wish to proceed to the CCAA Advanced Concrete Technology Course (ACT).

# 2 — Course Structure

As outlined earlier, there are 28 modules in total. The modules have been developed in a logical sequence to assist in creating a better understanding of concrete technology. There are two additional modules: (A) Reporting and Report Writing – Technical Investigations, and (B) Laboratory Visit Notebook & Report Requirements.

A folder containing the notes for each of the modules (listed below) will be mailed to learners upon receipt of registration. These notes may be referred to during the course and during the open book examination.

## Block 1: Course Introduction

- Module 1: Concrete Technology Course (CTC) Introduction
- Module 2: Our Work Environment
- Module 3: Concrete Sustainability / Green Star

## Block 2: Concrete Materials

- Module 4a: Cementitious Materials (Portland and Blended Cements)
- Module 4b: Cementitious Materials (Introduction to SCMs)
- Module 5: Fly Ash
- Module 6: Slag
- Module 7: Amorphous Silicas
- Module 8: Concrete Aggregates
- Module 9: Water and Concrete
- Module 10: Admixtures
- Module 11: Materials Testing (Testing Cement and Materials)

## Block 3: Producing and Testing Concrete

- Module 12: Specification and Supply
- Module 13: Quality Assurance and Quality Control
- Module 14: Concrete Properties
- Module 15: Testing Concrete
- Module 16: Non-Destructive Testing (NDT)
- Module 17: Concrete Mix Design

## Block 4: Placing and Finishing Practices

- Module 18: Hot and Cold Weather Concrete
- Module 19: Compaction of Concrete
- Module 20: Curing of Concrete
- Module 21: Formwork and Finishes (Implications and Considerations)

## Block 5: Speciality Concrete Applications

- Module 22: Industrial Floors and Pavements
- Module 23: Special Paving Finishes
- Module 24: High Performance and Speciality Concrete
- Module 25: Reinforced and Pre-Stressed Concrete with Pre- and Post-Tensioning

## Block 6: Concrete Performance Characteristics

- Module 26: Durability (Structural)
- Module 27: Trouble Shooting, Investigations and Failure Modes
- Module 28: Alternative Binders-Alkali Activated Materials

## Supplementary Information

- Module A: Reporting and Report Writing – Technical Investigations
- Module B: Laboratory Visit Notebook & Report Requirements

