

# RIICRC316E

## Place and Compact Concrete

### Learner Guide Instructions

Who is this document for?

The learner.

What is in this document?

- Course training content (this matches the PowerPoint Presentation).
- Review questions.

What do you need to do before you use it for the first time?

1. Rebrand the document.
2. Review the document as part of your validation process.

**See the 'Read Me First' document for a complete set of instructions on how to use these resources.**



# LEARNER GUIDE

# RIICRC316E Place and Compact Concrete

<b>Learner Name:</b>	
<b>Learner ID:</b>	
<b>Learner Contact Number:</b>	
<b>Learner Email Address:</b>	
<b>Date Training Commenced:</b>	

## This Book Contains:

- Course Information.
- Review Questions.

# Table of Contents

<b>1.1 Introduction</b> .....	<b>4</b>
<b>1.2 Plan for the Job</b> .....	<b>4</b>
1.2.1 Confirm Work Requirements .....	5
1.2.2 Access and Interpret Documentation .....	6
1.2.3 Health and Safety Rules.....	7
1.2.4 Communication .....	7
Review Questions .....	8
<b>1.3 Risk Management</b> .....	<b>10</b>
1.3.1 Identify and Address Risks, Hazards and Environmental Issues .....	11
1.3.2 Control Identified Hazards .....	12
1.3.3 Select and Wear Personal Protective Equipment.....	13
1.3.4 Signage .....	13
1.3.4.1 Implementing Signage and Barriers.....	14
Review Questions .....	16
<b>1.4 Select and Inspect Equipment</b> .....	<b>18</b>
1.4.1 Select and Inspect Plant, Tools and Equipment .....	18
1.4.2 Manufacturer Documentation .....	19
Review Questions .....	19
<b>1.5 Define and Prepare Work Area</b> .....	<b>20</b>
1.5.1 Establish the Pour Location .....	20
1.5.2 Locate the Position for Material Placement.....	22
1.5.3 Maintain a Safe Working Area .....	22
1.5.4 Locate and Select Plant, Tools and Equipment .....	23
1.5.5 Undertake Pre-Pour Inspections .....	25
Review Questions .....	25
<b>2.1 Place and Compact Concrete</b> .....	<b>28</b>
2.1.1 Monitor Changes to the Work Environment.....	28
2.1.2 Place Concrete in Layers.....	28
2.1.3 Minimise Vertical Drop to Avoid Segregation.....	29
2.1.4 Vibrate Concrete .....	29
2.1.5 Compact Concrete.....	30
2.1.6 Manage Final Placement Levels .....	31
Review Questions .....	31
<b>2.2 Screed, Level and Finish Concrete</b> .....	<b>33</b>
2.2.1 Screed and Level Concrete.....	34
2.2.2 Finish Concrete .....	35
Review Questions .....	35
<b>3.1 Conduct Clean-Up Activities</b> .....	<b>37</b>
3.1.1 Manage Clean-Up Activities.....	37
3.1.2 Manage Tools and Equipment .....	38
Review Questions .....	38

# 1.1 Introduction

This training course is based on the national unit of competency **RIICRC316E – Place and Compact Concrete**.

This course will cover the following key aspects of concrete placement and compaction:

- ◆ Review of work requirements and documentation.
- ◆ Management of work health, safety and environment.
- ◆ Selection, use and storage of tools.
- ◆ Preparation of work area.
- ◆ Placement and compaction of concrete.
- ◆ Management of clean-up activities and tools.



The following terminology will be used throughout this training material:

Terminology	Explanation
<b>Concrete</b>	Concrete is a composite building material made from fine and coarse aggregates blended with a combination of cement, water and additives that hardens or cures over time.
<b>Batch</b>	The activity of combining and mixing the concrete ingredients to create a mix or load.
<b>Placement</b>	The process of depositing concrete into its final location.
<b>Compaction</b>	The process of expelling air voids or pockets within the concrete to improve strength.

# 1.2 Plan for the Job

Be clear about the work you will be doing. Make sure you have everything about the job written down before you start, including what you will be doing, how you will be doing it and what equipment you will be using.

Your work instructions, plans and drawings will guide you and help you ensure you complete the job per the job requirements. Work requirements can include:

- ◆ Project dimensions.
- ◆ Project tolerances.
- ◆ Standards of work.
- ◆ Material standards.

You can ensure you complete the job safely without damaging equipment or putting people in unsafe situations by checking and following your work requirements.



## 1.2.1 Confirm Work Requirements



Every civil construction and concreting project will have to meet specific work requirements. As concrete has a short shelf life from batching to placing and finishing, you must understand your work requirements before beginning the job.

The requirements for the job can change based on the environmental conditions, type of pour, discharge method, and traffic and weather conditions.

The concrete suppliers and contractors can provide detailed information on how these factors may impact the work being completed, so they should be contacted and involved in the planning process.

Before receiving the concrete delivery, you should confirm with the supplier if any specific factors may impact the work requirements and how the work is completed. This could include asking them about the:

- ◆ **Size** – How big is the job? How many cubic metres of concrete will be needed?
- ◆ **Location** – Where is the job site?
- ◆ **Traffic management** – Where are the safe entry and exit points? Will there be any off-site queuing or community issues (for example, a school across the road)?
- ◆ **Type of concrete** – What is the required strength, aggregate size, specification, and slump of the concrete?
- ◆ **Timing** – When is the first truck needed on site?
- ◆ **Truck spacing** – What is the estimated time to discharge each truck on site? How many trucks can fit on site at once?
- ◆ **Site hazards, control measures and rules** – Is there any high-rise construction involving cranes and boom pumps on site?
- ◆ **Site licence conditions** – Do noise hours need to be considered? Should reverse squawkers be on trucks?
- ◆ **Discharge method** – Will the job involve using direct, pump, wheelbarrow, crane or kibble discharge methods?
- ◆ **Testing requirements** – Frequency and test type, location for testers, testing waste collection and removal.



Your work site may already have checklists and procedures to ensure that the details of the work requirements are confirmed and communicated to all relevant personnel before the concrete is delivered. Speak with your supervisor if you do not understand the job's work requirements.

## 1.2.2 Access and Interpret Documentation

A set of records will accompany each concrete pour. Understanding what information is required and how to interpret the information is essential. Different companies use various templates and terminology, so clarifying what you need ahead of time and how to collate, store and manage the information on the day will ensure that your job occurs without delay.

The types of documentation that may be required include:

Document Type	Examples
<b>Health, Safety and Environment</b>	Toolbox talks, site induction handouts, safe work method statements, health, safety and environmental policies and procedures, hazard report forms, incident reports, audit checklists, site checklists, site health, safety and environmental plans.
<b>Concrete Specific</b>	Specifications, designs, quality, inspection and testing plans.
<b>Operational</b>	Site maps, work instructions, project plans, construction plans.

Design engineers and architects determine the concrete's specifications to meet the structural and design requirements of the task. Specifications such as road, bridge or kerb mixes may be based on standard industry specifications, set by government agencies, or unique to the site or project.

Specifications may define:

- ◆ The type or size of aggregate to be used.
- ◆ The type and amount of water to be added.
- ◆ The type and frequency of testing to be conducted.
- ◆ The required strength to be achieved.
- ◆ Approval for the nominated mix to be used.
- ◆ The maximum period of time from batching to placement and compaction.
- ◆ Concrete temperature requirements.
- ◆ Slump and water/cement ratio requirements.



It is important to understand the specification of the concrete being placed to ensure that it is supplied in accordance with the specification and placed and compacted appropriately.

Responsibility for checking each load record should be assigned, with the responsible person able to identify and manage issues and immediately communicate them to the appropriate person.

A site delivery log may be required to ensure that key concrete delivery information is checked before placement by the person managing the concrete deliveries. This may include:

- Number of loads.
- Time on site.
- Docket number.
- Recorded slump.
- Concrete temperature.

Often the site delivery log is completed as trucks arrive at the site. This will assist to identify which loads need to be tested, where testing is being conducted at a set frequency. These site delivery logs and information can also be useful for the concrete customer to confirm the quantity of material received, resolve disputes and for quality auditing.

Issues such as overly dry or wet loads, loads being delivered out of tolerance or time may be modified or even rejected from the site. Authority for managing these decisions and communicating with the delivery personnel should be established before the pour begins.



### 1.2.3 Health and Safety Rules

Every workplace has to follow laws and rules to keep everyone safe. There are 4 main types:

Rule	Explanation
<b>Acts</b>	Laws that protect the health, safety and welfare of people at work.
<b>Regulations</b>	Gives more details or information on particular parts of the Act.
<b>Codes of Practice</b>	Are practical instructions on how to meet the terms of the Law.
<b>Australian Standards</b>	Give you the minimum levels of performance or quality for a hazard, work process or product.

Some states use OHS laws, and other states use WHS laws. They both talk about the same thing, but use different words or names for people.

### 1.2.4 Communication

Good communication with all personnel will ensure that your pour runs smoothly on the day. This will also ensure any necessary information, updates and changes are communicated to the relevant personnel as required.



Personnel you may need to communicate with include:

- ◆ Supervisors and management.
- ◆ Concrete suppliers.
- ◆ Plant and vehicle operators.
- ◆ Delivery personnel.
- ◆ Pump operators.
- ◆ Testers.
- ◆ Engineers and designers.
- ◆ Concrete placers.
- ◆ Safety personnel.
- ◆ Contractors.
- ◆ Site visitors.
- ◆ Certifiers.



When communicating it is important to be clear and concise with important information, such as work instructions. Think about the language and literacy needs of the personnel, it may be helpful to use a combination of visual cues such as signage, symbols and pictures to help to make the message easier to understand.

Regular communication via site meetings and active supervision can help to make sure that changes on site are addressed and communicated as they occur.

Ensure you understand your communication requirements, including the use of appropriate techniques and aids, by reviewing your site policies and procedures.

## Review Questions

<b>1.</b>	Before receiving a concrete delivery, who should you confirm the size of the pour and concrete type with?	<input type="checkbox"/>



**2.**

In what types of documentation might you find concrete specific information?



**3.**

Provide three (3) examples of site documentation related to health, safety and/or environment that you may need to access and apply.



1.

2.

3.

**4.**

What health and safety information can you find in 'Australian Standards'?



**5.**

List four (4) personnel you may need to communicate with on site.



1.

2.

3.

4.

**6.**

What documentation should you review to ensure you understand your site communication requirements, including the use of appropriate techniques and aids?



## 1.3 Risk Management

Before you start work, you need to check for any hazards or risks in the area.

If you find a hazard or risk you need to do something to control it. By lowering or removing risks we can make hazards less dangerous. This will help to make the workplace safer.



### 1.3.1 Identify and Address Risks, Hazards and Environmental Issues

Concrete pour sites have many risks specific to the activity and environment. There is a range of information available from regulators and industry groups, such as concrete or pumping associations, that has been developed for concrete related activities to provide guidance on hazards and suggested controls for this activity. You may also find information about hazards and control measures relevant to your worksite in your work instructions and site documentation.



Performing a risk assessment prior to work commencing is a good way to identify and prepare for potential hazards. In performing your risk assessment, consider the types of activities being conducted, how those people will perform their tasks and where on the site they will occur.

Safety hazards to consider include:



- ◆ **Traffic management hazards** – Entry/exit, travel to the pour location, turning area, reversing.
- ◆ **Overhead powerlines** – Contact with agitator trucks or concrete pump booms.
- ◆ **Ground conditions** – Soft ground, uneven ground, soft edges, unprotected or unmarked edges.
- ◆ **Pedestrian management** – Persons on foot in trafficked areas including testers, spotters and pump operators.
- ◆ **Concrete pump line blockages** – Line blowouts.
- ◆ **Slips, trips and falls** – Persons falling from concrete pumps and the back of agitator trucks, slipping on uneven ground, tripping on exposed reo-bar.
- ◆ **Ergonomics** – Frequent bending, lifting and dragging of pump hoses, screeding concrete by hand, wheelbarrowing concrete.

As part of planning for concrete operations, sites must consider the impact to the environment. In doing so an environmental management plan may be developed which outlines the potential hazards and risks to the environment and the required control measures. The content of these plans should be included in site documents and information such as inductions, safe work procedures and toolbox talks.

Environmental hazards may include:

- ◆ **Contamination and spills** – Material being tracked onto roads and slurry washing into roadways and waterways.
- ◆ **Pump washout areas** – Contaminated water, slurry or concrete washing onto the ground or into waterways.

Once you have identified hazards, risks and environmental issues on site it is important to communicate them to others. This may be through a hazard report, speaking directly to the supervisor or including it in your work procedures.



## 1.3.2 Control Identified Hazards

Once you have identified that a hazard exists you will need to manage it by implementing suitable controls.

Control measures will prevent the identified hazard from causing harm.

When implementing your control measures consider what is practical for the site to apply and use the Hierarchy of Hazard Control to select the most effective control measures for the circumstances. Try to apply control measures that are higher up the hierarchy wherever practicable to ensure they provide the best level of protection.

Hierarchy Level	Explanation	Example Control Measures
<b>1. Elimination</b>	Completely remove the hazard. This is the best kind of hazard control.	Animals and pets may be banned from site to prevent accidents.
<b>2. Substitution</b>	Swap a dangerous work method or situation for one that is less dangerous.	Certain chemicals may be replaced with those which are less harmful if contact with the skin occurs. Reversing beepers on trucks may be replaced with squawkers so the sound doesn't carry as far impacting neighbours.
<b>3. Isolation</b>	Isolate or restrict access to the hazard.	Exclusion zones may be established to separate personnel and operating plant. Guards are placed over the concrete pump hopper to prevent access to moving parts. Sediment control fences installed to prevent dirty runoff water from leaving site damaging the environment.
<b>4. Engineering Controls</b>	Use equipment to lower the risk level.	A line pump may be set up to transfer concrete across long distances instead of manually moving it. Wheel washes may be constructed at the exit to the site to ensure that all trucks have clean wheels before exiting onto public roads and do not contaminate waterways.
<b>5. Administrative Controls</b>	Site rules and policies attempt to control a hazard.	Reversing trucks require a person to be the spotter while the task is being performed. Traffic control signage used to manage vehicles entering and exiting. Bins for different types of waste with signage to store and separate waste material.
<b>6. Personal Protective Equipment</b>	The least effective control. Use PPE while you carry out your work.	PPE such as hearing protection, safety glasses or gloves.

### 1.3.3 Select and Wear Personal Protective Equipment

Personal protective equipment should be selected and worn in accordance with the site requirements. Many sites will define the minimum PPE required in their site induction information and site entry signage. In addition you should be aware of any hazard specific risks, for example hazardous substances being used, and apply the PPE appropriate to the situation.

Common PPE may include:

- ◆ Safety glasses.
- ◆ Hearing protection.
- ◆ Gloves.
- ◆ Respirators.
- ◆ Hard hats.
- ◆ Hi-visibility clothing.
- ◆ Safety footwear.



Hearing protection and safety glasses are often required when working near concrete pumps and agitator trucks due to the noise and potential for foreign substances such as concrete slurry to enter the eyes as the pump receives and draws in the concrete.

Gloves are also commonly used to prevent contact with concrete. When selecting gloves, it is important to select the type of glove appropriate for the task. Tight-fitting gloves will prevent concrete from entering the glove and reduce the likelihood of skin reactions or burns. Inspecting the gloves before wearing to identify any tears or openings will ensure they can provide the best protection possible.

For PPE to be effective it needs to be in good condition, without damage and be worn per the manufacturer's instructions. Remember, PPE is the last means of defence, so you must use it correctly.

### 1.3.4 Signage

Use signage to display important information and communicate messages quickly and efficiently.

Construction sites can be busy places. Sometimes many tasks are being completed at once. Having appropriate signage helps to keep everyone on site safe. In addition, signs with pictures can make information easier to understand, especially for those with language or literacy barriers.

Directional signs are necessary on a work site to ensure personnel know where to go. This includes appropriate entry and exit points, emergency assembly points, and escape routes.



You may see the following signs in use on construction sites:

- ◆ Site entry.
- ◆ Site office.
- ◆ Sign-in.
- ◆ Parking.
- ◆ Wheel wash.
- ◆ PPE rules.
- ◆ Traffic management signage.
- ◆ Overhead powerlines.



The use of signage is an important tool for the communication of critical health, safety and environmental information about potential hazards, control measures and site rules to ensure the safety of all persons entering the site.

They can be placed at the location of a hazard as a warning and be used to directly communicate with anyone in the vicinity. Certain colours such as red and yellow are commonly used in barricading, warning tape and signage to indicate that danger is present, and caution is required.

You may locate details of where to position signage using site checklists, risk assessments, safety and environmental management plans, and safety and environmental procedures. If you are unsure about the signage requirements for your task, speak to your supervisor.

### 1.3.4.1 Implementing Signage and Barriers

If the concrete pour is to be carried out on a road or in a public area, for example pouring footpaths directly from the chute of the agitator truck adjacent to a road, you are required to protect the public and provide a safe route around the work space.





In some cases you may need to isolate the work area. Set up barricades and signage to warn others that you are working in the area and that it is dangerous for them to come too close.

You will most likely be required to:

- ◆ Close or partially close access to roads or footpaths.
- ◆ Barricade the work area to protect pedestrians and prevent vehicle entry.
- ◆ Set up warning signs and caution lighting where necessary.
- ◆ Organise for traffic to be re-directed.
- ◆ Provide directions to any foot or vehicle traffic along a safe, alternate path.

Signs and barriers you may use to make your work area safe include:

- ◆ Danger signs – Red danger signs such as “Prepare to Stop”.
- ◆ Warning signs – e.g. “Roadwork ahead”.
- ◆ Flashing lights.
- ◆ Barricades, fences and cones.
- ◆ Flashing multi-message signs.
- ◆ Arrow boards.
- ◆ Bollards.
- ◆ Portable traffic lights and signals.
- ◆ Hazard markers.



Although there are a number of site signs which will be used across most sites, signage and barrier requirements will differ depending on the type of work and location. Refer to your site policies, procedures and documentation for details about the isolation, signage, and traffic control requirements relating to your site and task.

Once you have completed the assessment of your signage needs and reviewed the hazards and activities happening at your site, ensure that the signage is placed securely, is suitable for the environment and does not cause any visual obstructions or hazards for personnel and traffic in the area.

## Review Questions

7.

What should you consider when performing a risk assessment?

8.

What will an environmental management plan outline?

9.

What might be used to prevent dirty runoff water from leaving the site and damaging the environment?

10.

Which types of PPE are often required when working near concrete pumps and agitator trucks?