How to use Low Carbon Concrete

This fact sheet provides simple guidance to help you use low carbon concrete.

Reason for using low carbon concrete

Concrete is typically made up of just 10–15% cement. However, cement production contributes up to 95% of concrete's embodied carbon. The large carbon footprint is due to chemical reactions that happen during the heating process of the raw materials used to make Portland cement, combined with combustion emissions from the burning of coal or gas during the calcination process.

You can quickly cut emissions in your project by limiting embodied carbon, increasing cement replacement and capping cement use in mixes.

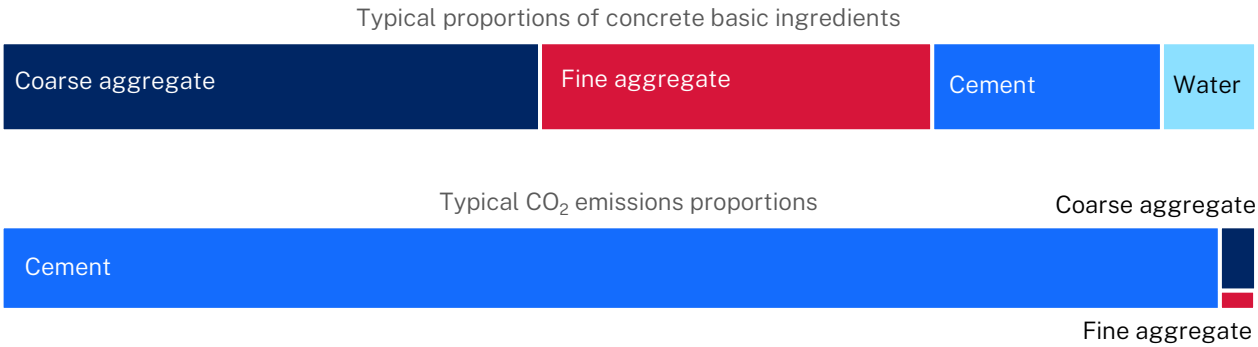

Figure 1 Typical concrete ingredients versus their typical CO_2 emissions

https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/low-emissions-specifications

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How are low carbon concrete requirements set?

Low carbon concrete requirements are outlined in the NSW Government Low Carbon Concrete Specifications documents. These low carbon concrete requirements are designed to match what suppliers can currently offer while also encouraging competition between contractors and suppliers. This helps reduce embodied carbon and promotes innovative, market-friendly solutions.

When should the requirements be used?

To use low carbon concrete in your project, start early and integrate requirements from the design stage through to construction. The earlier you set and communicate these requirements to suppliers, the greater the impact and the lower the cost.

Major concrete suppliers are ready to meet an increased demand for low carbon concrete. However, using low carbon concrete requires engaging with suppliers early to give them time to meet your needs.

In regional areas, this could mean contacting suppliers 6-9 months in advance. In Sydney metropolitan areas 4-5 months' notice is advised.

Figure 1 Implementing low carbon concrete requires a multi-stage approach. The best outcomes will be achieved when you take steps to include it at every phase of the project.

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How to use low carbon concrete

Using low carbon concrete is just one way to reduce the carbon impact of your project. In the early stages of your project, apply the carbon reduction hierarchy of first avoid, then reduce, then substitute; and look for and design efficiencies to cut emissions.

The actions you can take at different stages of the project to influence the low carbon concrete outcomes are outlined below:

1. Project initiation, master planning and feasibility development

- **Low carbon concrete goals:** Include low carbon concrete requirements in project briefing documents. These will set carbon reduction and cement replacement targets for the project.
- **Initial engagement with suppliers to assess local availability:** Engage early with concrete suppliers to assess local availability and determine the feasibility of incorporating low carbon concrete for a specific project.

2. Schematic development and reference design

- **Material selection:** Consultants should include low carbon requirements when developing their specifications.
- **Emissions evaluation**: Assess the emissions of different low carbon concrete options to guide your decision.
- **Collaboration and communication**: Encourage collaboration and communication between the design team, concrete and precast suppliers, and other stakeholders to maximise the use of low carbon concrete.

3. Contract documentation

- **Include the low carbon concrete requirements specified in the Low Carbon Concrete Specifications Briefing Document in contract documents**: Clearly specify the use of low carbon concrete in the contract and outline the project requirements.
- **Include requirements to set up a concrete working group**, which meets every 2-4 weeks. The group should include designers, procurement, contractor and client management, a low carbon concrete champion and sustainability manager to oversee the use of low carbon concrete.
- **Take minutes** of each working group meeting and provide them to the project/client leadership teams.

3.1. **Incentives**: Consider offering incentives for contractors who exceed low carbon concrete targets.

4. Procurement

- **Low carbon concrete champion**: Appoint a project delivery champion to drive the use of low carbon concrete. The champion will make sure the requirements are included in procurement documents before to going to market, engage with suppliers, pre-casters and contractors to advise them that low carbon concrete will be a project requirement.
- **Supplier evaluation**: Suppliers must demonstrate their ability to deliver low carbon concrete. Evaluate their track record of using low carbon concrete and recycled materials in concrete and ability to meet the project targets.
- **Contractor commitment:** When possible, select contractors who show a commitment to using low carbon concrete.

Design and construction

- **Design packages**: Consultants and designers should refer to the low carbon concrete requirements in their specifications and design packages. Targets must be clearly included in drawings and all relevant project documents.
- **Implementation and monitoring**: Establish a working group to meet every 2-4 weeks with designers, procurement, contractor management, client management, low carbon concrete champion and sustainability manager to work through how to use low carbon concrete on the project.
- **Regular auditing and compliance**: Conduct regular checks to confirm that low carbon concrete is being used as planned and that targets are being met.
- **Performance evaluation**: Evaluate the performance of low carbon concrete in terms of strength, durability, and environmental impact during and after construction.

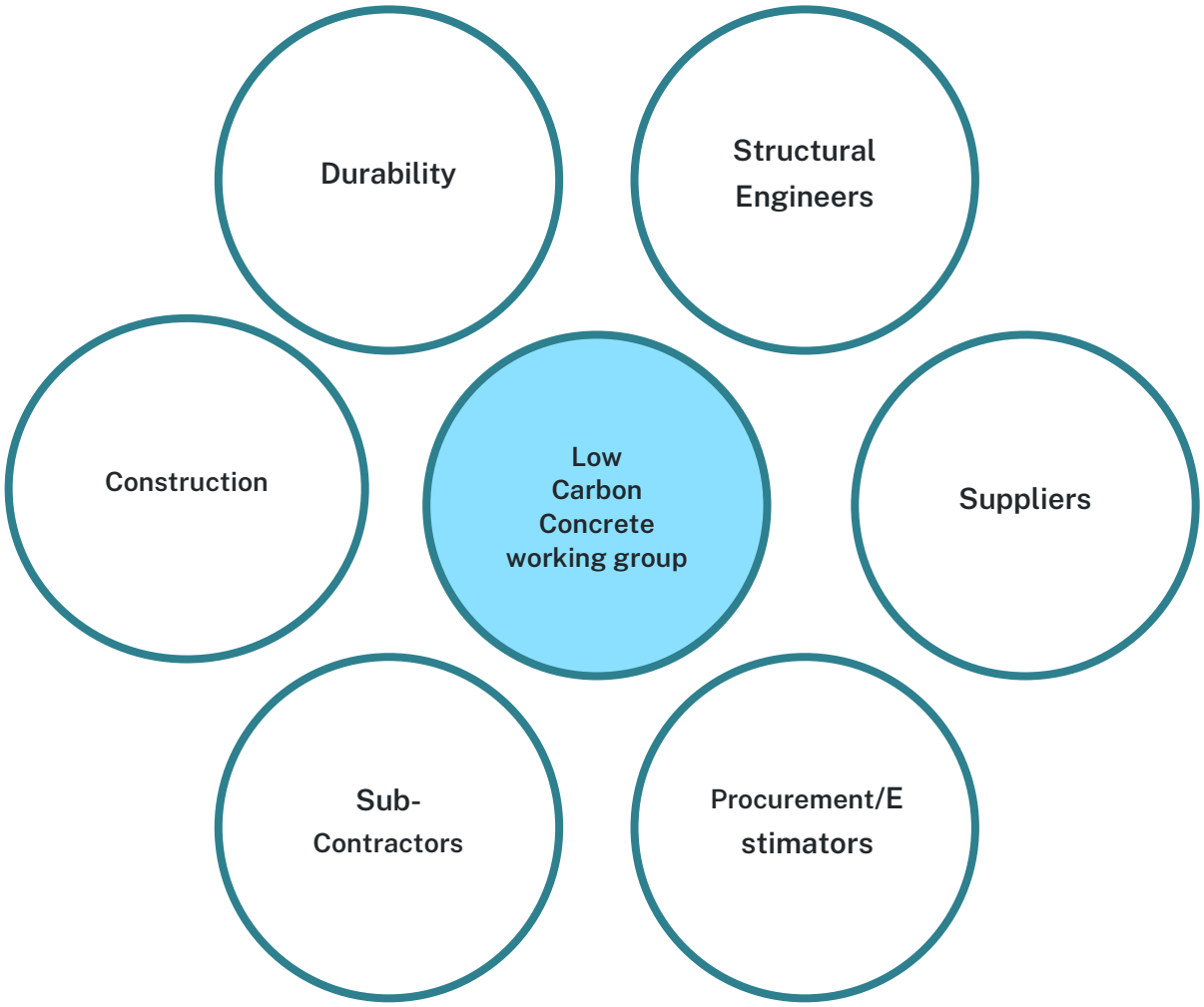

Figure 2 Establishing a working group to work through the incorporation of low carbon concrete on the project is the key for success

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