

# DALLCON

*Our Reputation is set in Concrete!*



OHS  
ISO 45001  
SAI GLOBAL



Quality  
ISO 9001  
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Environment  
ISO 14001  
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# — WHY MPA MATTERS IN — PRECAST CONCRETE?



# WHY IS MPA IMPORTANT FOR CONCRETE PRODUCTS?

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News of failures of concrete structures around the world at different times (like Miami bridge collapse in 2018) is certain to keep you awake at night if you have recently adopted (or thinking about adopting) precast concrete products in your projects. Flawed design and lax oversight are to be blamed the most for failures of such structures of recent times however as there are strict regulations that govern the quality of products used in construction, at least in the developed world. Nevertheless, incorrect selection of materials, errors in design calculation and detailing, improper construction techniques, insufficient quality control and supervision, and external mechanical factors – all contribute equally to what could be a catastrophic failure.

**Acknowledging the quality of a concrete product and reviewing its operational duration is one of many important things we should all be aware of.**





# WHAT DETERMINES THE STRENGTH OF CONCRETE?

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Concrete is a mixture of cement, water, coarse aggregate (gravel), and fine aggregate (sand). When aggregate is mixed with cement and water, the mixture forms a fluid slurry that can easily be poured and moulded into the required shape. The cement then reacts with water and other ingredients over time, binding the materials together to form a hard matrix called concrete. Two major factors determine the strength of concrete: quality of each aggregate and the mix ratio.

The quality of each concrete mix heavily influences the strength of the end product. Cement, which comes in the form of

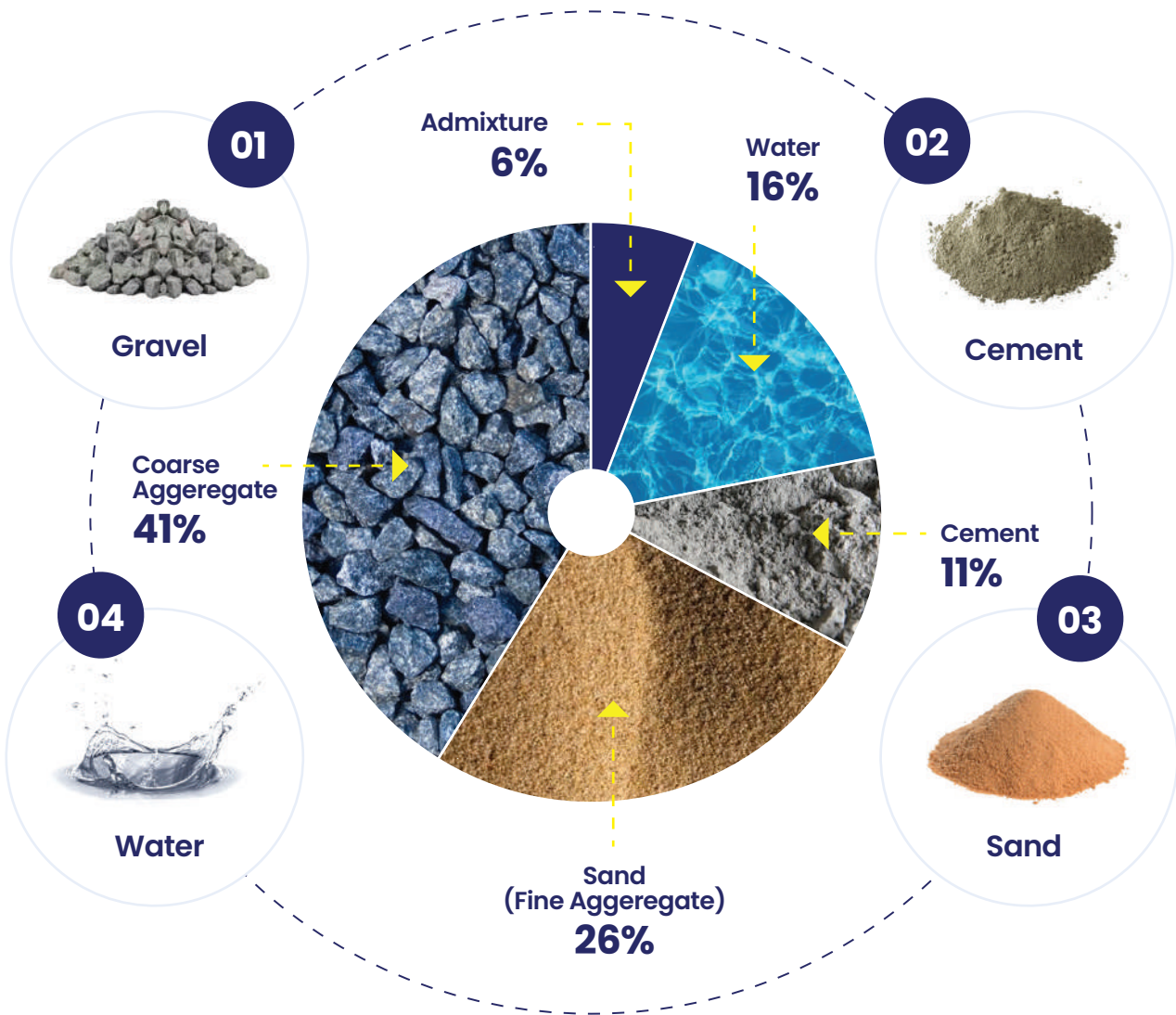
powder, is the major component of the concrete mixture and should not only be of high quality but also be stored correctly before being processed. Since cement is an absorbent material, it is highly reactive with moisture – either in liquid or in vapour form. Failing to store it in a dry environment can leave it exposed to moisture and then lead to the chemical reaction process called hydration, degrading the quality of cement and rendering it unusable. Additionally, the quality of aggregates, size, shape, and texture also plays a role in determining the strength of concrete. Presence of salt, silt, and clay in the aggregate can also make a difference in concrete's

quality salt, slit, and clay in the aggregate can also make a difference in concrete's quality.

A perfect mix ratio among the components is also vital to ensure the end product, as concrete, has the desired strength. The correct mix ratios mean the proper bonding between the elements

that ensures the best compressive strength.

As a consumer, however it is more likely that you want to be educated about the strength of the product as a whole rather than what determines the quality of the concrete that makes up the endproduct. The strength of concrete is defined by a unit called MPa.



## WHAT DETERMINES THE STRENGTH OF CONCRETE?

# HOW IS THE STRENGTH OF CONCRETE DETERMINED?

To ensure a concrete product delivers its best performance and lasts for as long as intended, inspectors usually test the strength of concrete once it has had time to dry. The strength of concrete is rated using Megapascals (MPa) in countries including Australia, where the metric system is apparent. In fewer countries like the UK and United States, however, Psi (pounds per square inch) is the term equivalent to Mpa. One psi value is about 0.0068915 MPa.



As the measure of compressive strength of concrete, MPa lets inspectors know the maximum pressure that can be applied to the concrete before it cracks or fails. One MPa equals to one million pascals. As pascal is one Newton of force per square meter, one megapascal is one million newtons per square meter. The higher the MPa of concrete, the stronger the material is.

# HOW IS MPA CALCULATED?

The strength of a concrete product is identified in the labs using press machines through a cylinder-testing process. Press machines put pressure on the concrete product from either side of the cylinder. Pressure gradually increases until the concrete cracks or breaks down. This way, the maximum stress a concrete product can withstand per square area is identified.



# WHY MPA MATTERS?

## STRENGTH OF CONCRETE

### 17 MPA

Minimum Strength  
Residential Projects

### 28 MPA

Minimum Strength  
Commercial Projects

### 41 MPA

High Strength  
Large Scale Projects

### 121 MPA – HIGH

Maximum Strength

The strength of a concrete product determines its use. The suggested minimum MPa of concrete products ranges from 17 in low-scale residential projects to 28 in commercial projects. Concrete products with MPa of 41 are considered high strength as such products are created for large-scale projects like bridges. The use of concrete products with MPa rating as high as 121 have been recorded in constructions till date.

Understanding MPa of a concrete product is important for the supplier as well as the user because it can determine a product's ability to tolerate load, environmental challenges, and other factors from which its purpose and lifespan can be figured out. Unable to use the product with the right MPa value can lead to disastrous consequences



# DALLCON FOR THE BEST PRE-CAST CONCRETE SOLUTION

Concrete products can be classified in several ways such as: according to the density of the product, its use, type of materials used in its making, its strength, and where it is cast. Before initiating most commercial projects that use concrete, however, it is crucial to consider the difference between precast concrete and in situ concrete for efficiency and effective results.



## PRECAST CONCRETE PRODUCTS:



Save construction time and cost



Possess better quality and better finishing



Guarantee cleaner and safer construction sites



Offer greater unobstructed spans



Provide better durability and load capacity of the structure



Dallcon provides **high-quality precast concrete products** that can be **custom made** according to your project requirements. All our products meet **Australian standards**. We offer a range of concrete products with appropriate **compressive strength (measured in MPa)** for your project that suits your specifications and lasts a lifetime.



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