

# CONCRETE FLEXIBILITY



**Concrete is highly flexible in Form, Finish and Function. This flexibility allows enormous scope to meet the most complex and demanding design and construction brief.**

Concrete has long been prized for its strength and durability. But it's equally loved for its ability to be moulded into various forms, for its infinite and unique range of finishes, and for its many functional applications in and outside the home.

## Form

The plasticity of concrete in its 'wet' state means it can be used to create almost any architectural form or combination.

## Linear

The most basic forms are **straight** and **rectilinear** (a combination of straight lines, right angles and square or rectangular shapes).

An example of a linear form is a straight concrete wall. Of course, the combining of lines and planes isn't restricted to 90 degree angles. Houses and buildings can also feature concrete forms that **fold** at a variety of angles (sometimes referred to as origami architecture).

Concrete can be used 'off-form' (supplied to site 'wet' and pumped into pre-constructed formwork, which is stripped after the concrete sets) or supplied as precast panels (manufactured in a factory and delivered to site as a complete section, or alternately cast in a formed-up bed on site and then lifted into place.)

Either way, the supply chain and the construction processes are well established – which means you benefit from the cost and time efficiencies of a tried and tested methodology.



## Featured Images

1. La Perouse Headland, Sydney. Source: Public Domain Awards, CCAA.
2. Ballast Point Park, Sydney. Source: Public Domain Awards, CCAA.

3. Harry's Park, Sydney. Source: Public Domain Awards, CCAA.
4. Sam Fitzman Park, Sydney. Source: Public Domain Awards, CCAA.

## CONCRETE IS HIGHLY FLEXIBLE IN FORM, FINISH AND FUNCTION



*“Concrete allowed us to get maximum spans and keep the floor depths to a minimum so we could achieve three levels of living space.”*

**Joe Adsett,**  
Joe Adsett Architects



*“The off-form concrete, in particular, adds a wonderful textural component - both visually and to the touch. One of the exciting aspects of working with this material is that until the formwork comes off, you actually don't know what you're getting.”*

**Gavin Maddock,**  
MADDOCK

### Curved

Designs can also feature forms that are **curved** (a single, smooth bend or arc) or **curvilinear** (multiple curves) - and again, concrete lends itself perfectly to executing both.

The Sydney Opera House is a classic example of curvilinear architecture.

The most common formwork used for these applications is plywood because of its bending qualities, however both curved steel and plastic formwork can also be used.

The set-up for a curved form can take longer and require greater care, but the results are worth it - flowing rooflines and curving wall structures that soften the impact of the material and impart a sense of movement, fluidity and connection to nature.

### Cantilevers, free and long-span spaces

One of the attributes that makes concrete so adaptable on a building site is its compressive strength - the capacity to withstand loads before failure. This, in turn, makes it ideal for cantilevered slabs and beams.

The term 'cantilever' usually refers to a horizontal form (a roof or floor) that is supported at only one end to create a clear space underneath.

A reinforced concrete slab or pre- or post-tensioned concrete beam is an ideal structural solution for cantilevers. It does not sag and lose strength like wood or corrode like steel, and has better resistance to fire and water damage.

Concrete's compressive strength also means it can achieve longer spans. This, in turn, means you can create more open spaces with fewer column supports.

### Finish

The grey colouring and smooth finish we most associate with concrete is loved by many for its simplicity, but it's only the beginning of the story.

#### Colour

Concrete can be coloured by incorporating a pigment (usually an iron oxide) into the concrete at the mixing stage, or by applying it as a dryshake topping once the uncoloured concrete is laid.

Concrete surfaces can also be stained, or coloured using a tinted sealer.

#### Texture

The sky's the limit when it comes to adding a unique texture to your concrete finish.

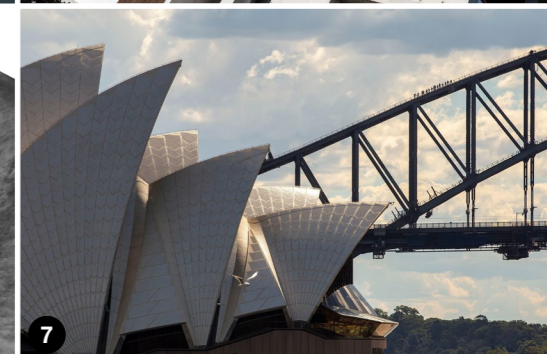
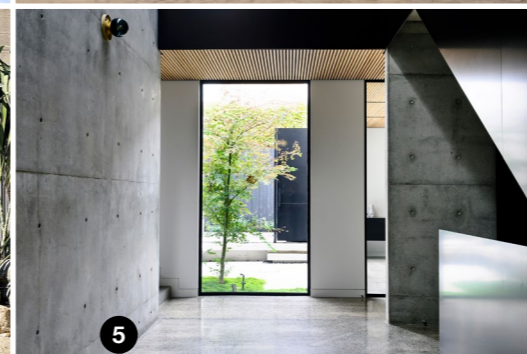
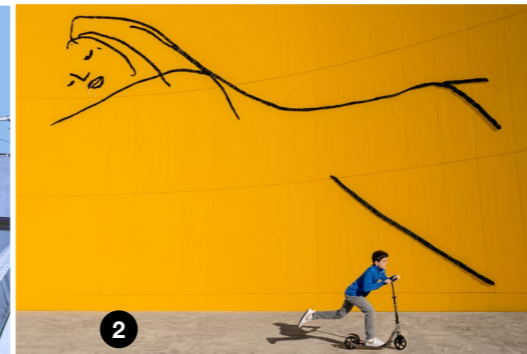
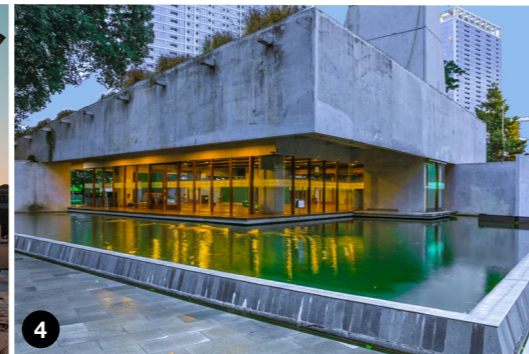
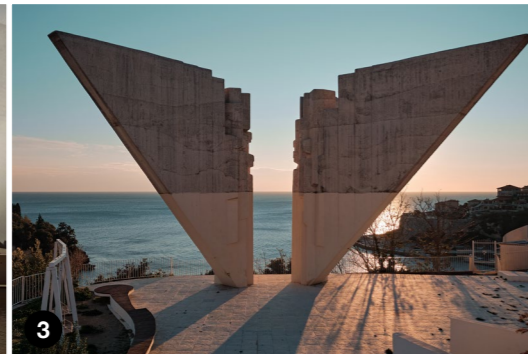
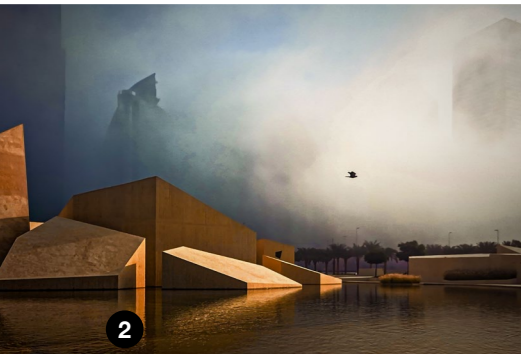
Texture can be achieved by using something as 'everyday' as a broom, a hessian bag or a sponge.

**Exposed aggregate** finishes are achieved by washing away the top layer of cement mortar from the surface of the concrete once it's initially set. 'Special' aggregates (for example, a specific coloured stone) can also be spread (broadcast) over the levelled concrete and tamped into the surface before it's floated.

Exposed aggregate finishes are often a feature of **polished** concrete floors, where the surface is ground, honed and polished using a mechanical grinder.

**Burnishing** is a different process that achieves similar results. It's achieved by applying a chemical coating (usually wax-based) to the concrete surface, and then using a burnishing machine that heats, melts and buff the coating.

Polished and burnished floors not only look great, but are incredibly durable.



#### Featured Images

1. Clifftop House, Tenerife QLD, Joe Adsett Architects. Source: CCAA Case Studies
2. Courtesy: GCCA. Photographer: Christopher Comesio. (@x2pher\_dot\_com), UAE
3. Courtesy: GCCA. Photographer: Alena Voracheva. (@vrch\_ph), Freedom Monument, Montenegro (@x2pher\_dot\_com), UAE.

4. Courtesy: GCCA. Photographer: Dikye Ariani (@dikye.ariani), Jakarta
5. Castle Cove House, Sydney. Architect: Terroir.
6. Las Palmas House, Noosa, Qld. Tim Ditchfield Architects - Oskar Booth Image: Scott Burrows Source: C+A Issue 31.

#### Featured Images

1. McAnally House, Sunshine Coast, QLD, Maddock Design. Source: CCAA Case Studies
2. Courtesy: GCCA Photographer: Pedro Ajuriaguerra (@PAjuriaguerra), Spain.
3. Adelaide Airport
4. President Apartments, Sydney. Candalepas Associates. Image: Geoff Howden

5. Light Vault House, Chamberlain Architects. Image: Derek Swallowell
6. Courtesy: GCCA. Photographer: Ferdz Bedaãa (@ferdzbedana), Skateboarder, Sharjah, UAE
7. Opera House, Sydney

## CONCRETE IS HIGHLY FLEXIBLE IN FORM, FINISH AND FUNCTION



*“Our views are all about looking through the trees, rather than over them. The idea of the sloping roof section was to expose the view behind us, which is probably the nicest.”*

**Andrew Nimmo** -  
*Lahznimmo Architects*

A concrete surface can also be **stamped** (imprinted) using a repeatable mould - a popular option for outdoor applications such as driveways and paths. In fact, it can be imprinted using just about anything that comes to hand, even leaves from a tree.

Concrete walls - whether they be the external and internal walls in your home or a retaining wall in the backyard or a park - can also be textured.

If the concrete wall sections are precast in a factory, a mould can be used to achieve a unique finish. If the concrete is poured on site, the surface finish can be manipulated by using different types of formwork. (This is known as an **off-form** finish.)

For example, plywood or a plastic formwork system can achieve a very clean, precise surface texture, whereas rough-sawn timber formwork will impart a very textured finish that, from a distance, will have the appearance of timber planks.

Some architects and homeowners want an industrial look; they'll deliberately expose and highlight the bolt holes and edge lines of the formwork in the surface.

The bottom line - whether it's a wall, a floor or anything in between, concrete provides almost limitless options to achieve a finish that is as unique as you are.

### Function

Concrete is much more than a structural solution. It can be used to create unique functional applications in and outside your home.

There's plenty of sound practical reasons for using concrete slabs, either at ground level or for upper floors, in houses and buildings. These slabs can also provide an 'all-in-one' solution for **flooring** and **ceilings**.

Rather than float a timber floor on top of the slab or lay tiles or carpet, concrete can be left exposed as a hard-wearing, finished flooring solution. A range of attractive textures can be imparted into concrete by colouring, polishing and/or burnishing the surface.

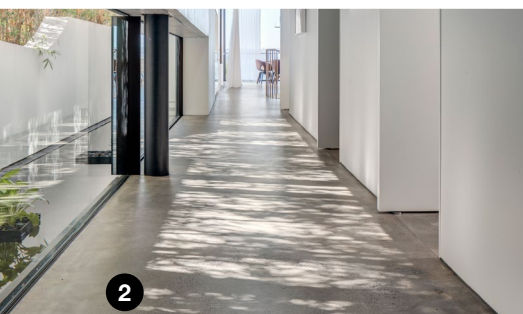
Equally, for upper floors the undersurface can be left exposed as the final ceiling solution, creating a minimalist or industrial look and feel.

Both these options can reduce overall materials usage and wastage, not to mention time and cost.

Concrete can also be incorporated into other functional areas in the home. Concrete dining **tables** and bathroom **vanities** for example are increasingly popular, both for their durability and uniqueness.

And concrete bench **seating** - be it inside or outside the home - provides a long-lasting, extremely durable furnishing solution.

For more information on concrete forms, functions and finishes, visit <https://www.futureproofwithconcrete.com.au/CaseStudies>



#### Featured Images

1. *Pretty Beach House, Central Coast NSW. Lahznimmo Architects.*  
Source: CCAA Case Studies. Photographer: Brett Boardman.
2. *Crescent House, Sydney. Matthew Woodward Architecture.*  
Source: CCAA Case Studies. Image: Murray Fredericks Photography
3. *Salmon House, Melbourne Architect. FGR Architects.*  
Source: CCAA Case Studies. Image: Peter Bennetts
4. *Town House Kingston University, London Grafton Architects.*  
Source: C+A Issue 34, CCAA.