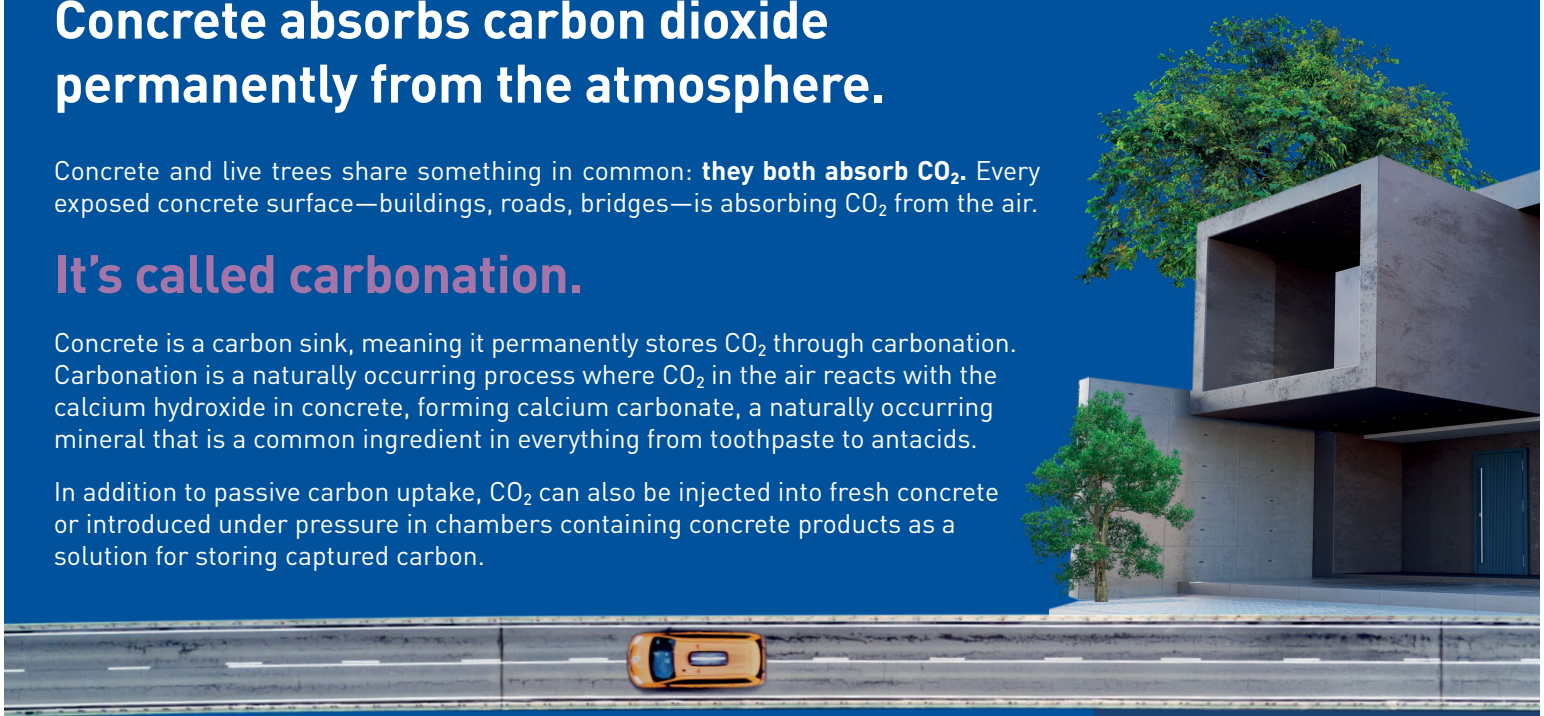
CARBON UPTAKE:

CLINKER (Key chemically reactive ingredient) | CEMENT (The binder) | CONCRETE (Critically useful material to society) | CONSTRUCTION (Service life / use phase impacts) | **CARBON UPTAKE** (Concrete is a CO_2 sink)

Concrete absorbs carbon dioxide permanently from the atmosphere.

Concrete and live trees share something in common: **they both absorb CO_2.** Every exposed concrete surface—buildings, roads, bridges—is absorbing CO_2 from the air.



It's called carbonation.

Concrete is a carbon sink, meaning it permanently stores CO_2 through carbonation. Carbonation is a naturally occurring process where CO_2 in the air reacts with the calcium hydroxide in concrete, forming calcium carbonate, a naturally occurring mineral that is a common ingredient in everything from toothpaste to antacids.

In addition to passive carbon uptake, CO_2 can also be injected into fresh concrete or introduced under pressure in chambers containing concrete products as a solution for storing captured carbon.

How much CO_2 can concrete absorb?

Over the course of its service life, a concrete structure can absorb at least 10% of CO_2 generated during the production of cement and concrete—a ratio that will increase as the industry continues to implement more sustainable manufacturing methods and materials.

How much CO_2 is sequestered depends on the surface area of exposed concrete, the amount of water and moisture available, the permeability of the concrete, and the length of exposure.

Concrete plays an integral role in addressing climate change and solving climate challenges

The many life-cycle benefits of concrete should be factored into sustainability planning across the public policy, design, and construction sectors. Concrete supports societal sustainability goals by:

Delivering a construction material that can be locally sourced and produced and is 100% recyclable

Providing resilient structures that can withstand the realities of climate change—concrete does not rust, rot, or burn

Complementing existing carbon sinks (like forests) by passively absorbing CO_2 and offering a place to permanently trap captured CO_2

The Carbon Uptake Cycle

Cement is the key ingredient in concrete—the material that we see all around us—and the production of cement releases CO_2. Cement is mixed with water and aggregates and hardens to form concrete. As a part of the curing process, calcium hydroxide is formed in the concrete.

Concrete is a porous material, like a sponge. CO_2 is absorbed by any exposed concrete surface. When that CO_2 reacts with the calcium hydroxide, it forms a mineral, and the carbon is permanently captured. This is carbonation.