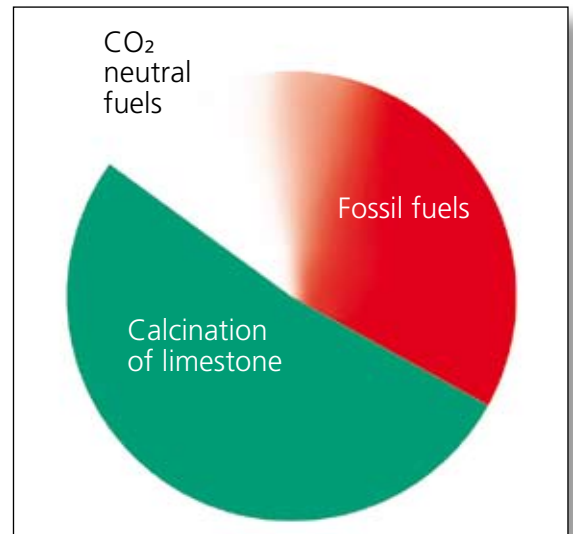


CO_2 UPTAKE DURING CONCRETE LIFE CYCLE



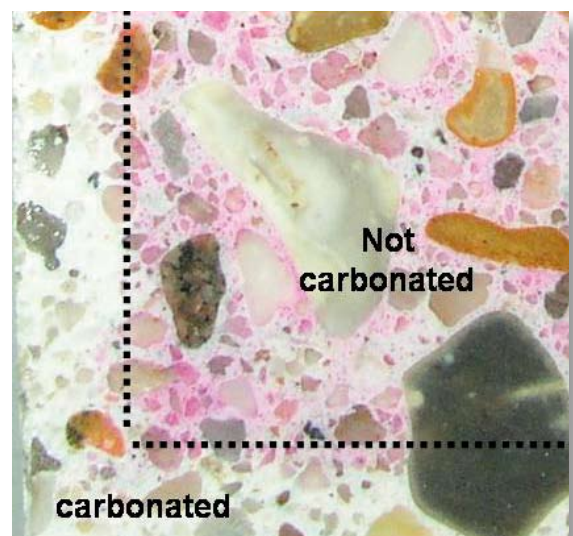
WHERE DOES CO₂ COME FROM?

- CO₂ emission from cement production accounts for 4% of the total CO₂ emission in Denmark.
- The CO₂ emitted during cement production stems from the calcination of limestone and the burning of fuels.
- The calcination of limestone is a process by which limestone (CaCO₃) becomes CaO, liberating CO₂ gases.
- The calcination of limestone accounts for more than 50% of the CO₂ emissions in a cement plant.

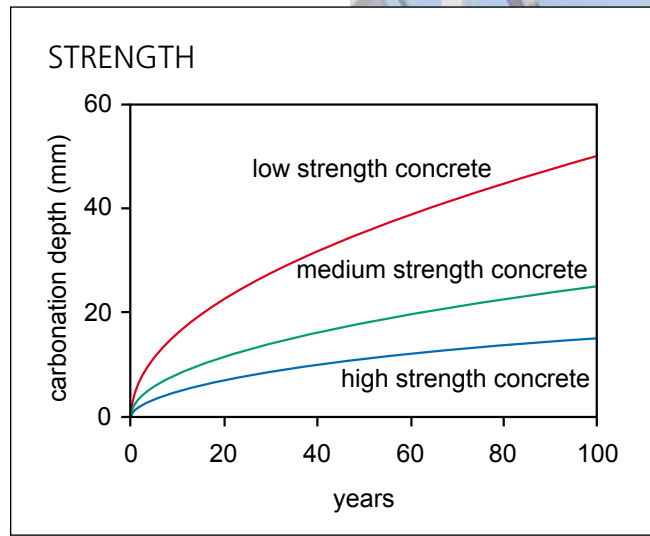
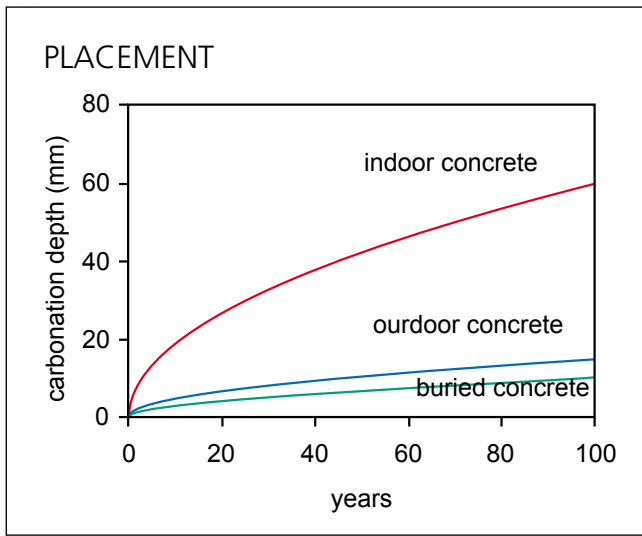


WHAT HAPPENS WHEN CEMENT IS USED?

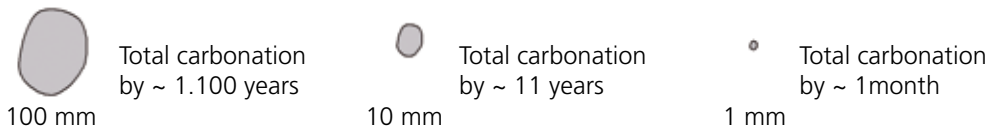
- CO₂ present in air reacts with the calcium in the cement forming calcium carbonate (CaCO₃). This reaction takes place within the concrete and is called **concrete carbonation**.
- Concrete carbonation is a natural process and helps reducing the atmospheric CO₂.



WHAT AFFECTS THE RATE OF CARBONATION?

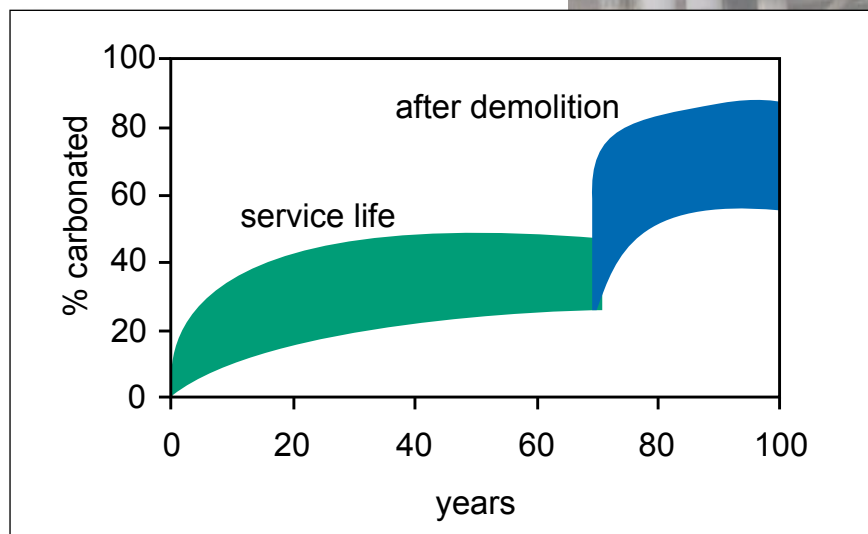


EXPOSED AREA



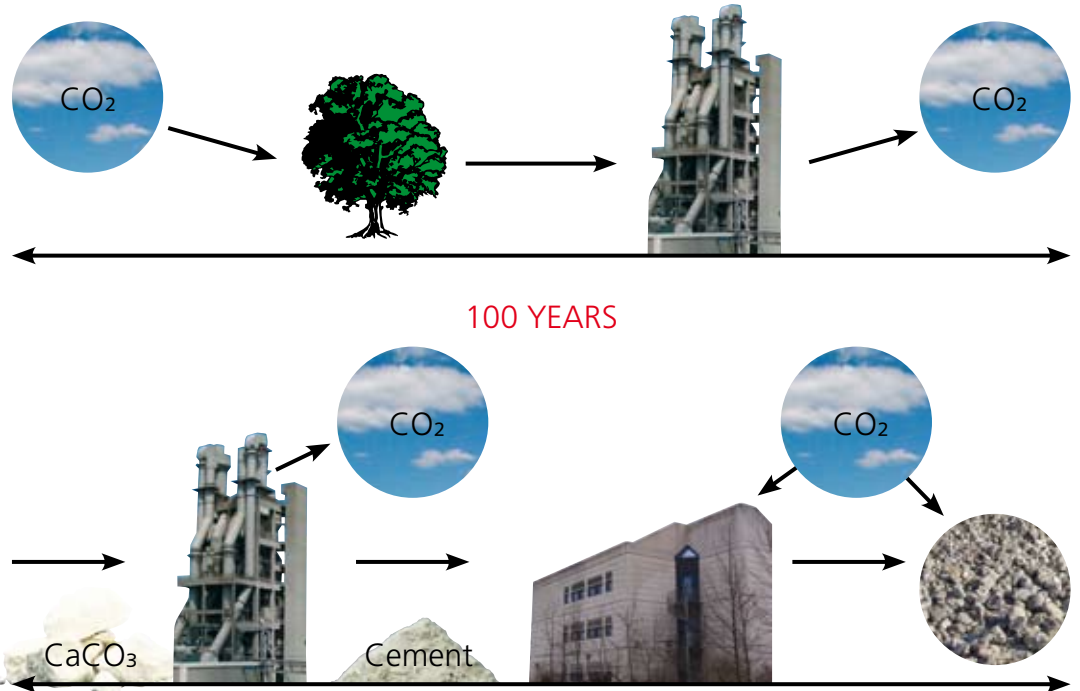
WHEN DOES CONCRETE CARBONATE?

- Concrete carbonates during the service life of the structure and after the structure is demolished and the concrete is recycled for secondary use.
- Recycling of concrete means crushing demolished concrete and reusing it in road construction.
- The carbonation of concrete increases significantly after demolition because of the reduction in particle sizes due to crushing.



CO₂ NEUTRALITY

- The CO₂ cycle in biofuels takes place within 100 years.
- Biofuels are CO₂ neutral.
- The CO₂ cycle in a large part of cement and concrete takes place within 100 years.
- A significant part of the calcination of limestone during cement production should be CO₂ neutral.



CLOSING THE CO₂ CYCLE...

- Recycling of demolished concrete increases significantly the absorption of the CO₂ released during calcination.
- In fact, crushing demolished concrete results in a total CO₂ uptake that is 2 to 2,5 times higher than the CO₂ uptake of concrete that is not recycled.
- Because of the favourable recycling policies in Nordic countries, a large percentage of the CO₂ released during calcination is reabsorbed within 100 years.
- Almost all the CO₂ released during calcination could be reabsorbed by concrete within 100 years if handling procedures for crushed concrete that maximize the CO₂ uptake are implemented.

