

SUSMICS-C : **S**ustainable + **SMI** ("Charcoal" in Japanese) + **C**arbon **S**torage - **C**oncrete

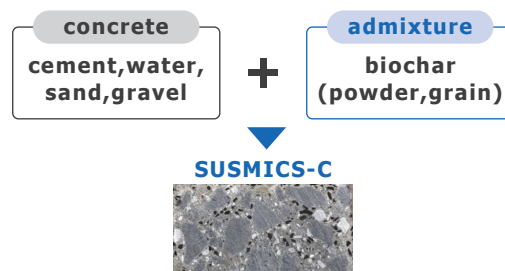
Summary

By using biochar as an admixture in concrete, carbon derived from photosynthesis can be stored inside the concrete material contributing to carbon neutrality. In addition, carbon negativity can also be achieved by using blast furnace slag cement.

Biochar: A Key Material for Achieving Global Climate Goals

SUSMICS-C is a concrete mixed with biochar made from sawdust which is usually discarded when sawing the wood. Carbon derived from CO₂ absorbed by trees through photosynthesis is settled when it is carbonized and is stored for a long period of time without returning to the atmosphere.

Cement, the main ingredient of concrete emits large amounts of CO₂ during its production. Analysis of the biochar mixed in SUSMICS-C shows that its carbon content is approximately 90%, and by balancing the CO₂ emissions from cement with carbon storage amount, carbon neutrality can be achieved.

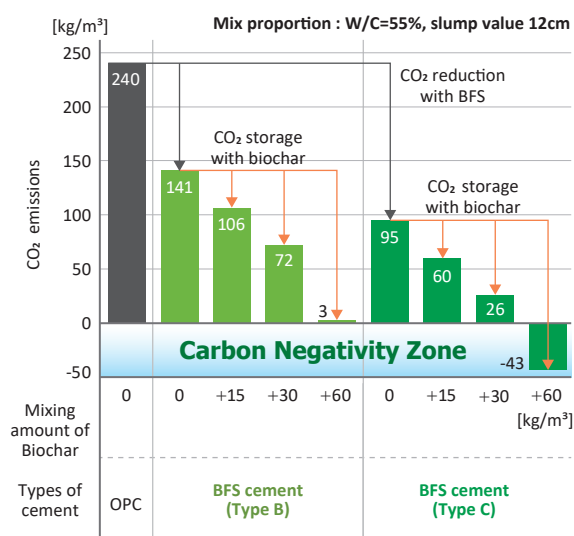


Material Properties and Versatility are Equivalent to Concrete using OPC

SUSMICS-C can be manufactured in a typical ready-mixed concrete plant. It has the same workability as concrete using Ordinary Portland cement (OPC) and can be pumped and placed at construction sites. Furthermore, it also has the identical compressive strength as OPC concrete and can ensure the strength required for structures.

Blast Furnace Slag (BFS) Cement: Achieving Carbon Negativity through Material Combinations

OPC, which is used in general concrete, emits about 200 to 300kg/m³ of CO₂ during its production. By using blast furnace slag (BFS) cement, which has a lower carbon footprint than OPC, CO₂ reductions can be achieved. Eventually carbon negativity can be attained by compensating the CO₂ emissions of other materials with the amount of CO₂ stored in biochar.

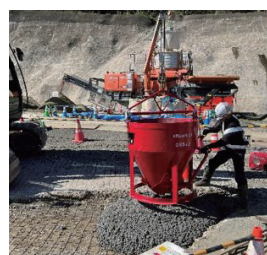


Type B : Cement in which approximately 40% of OPC is replaced with ground granulated blast furnace slag powder

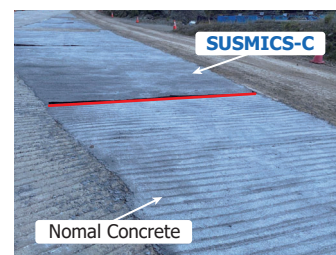
Type C : Cement in which approximately 60% of OPC is replaced with ground granulated blast furnace slag powder

Application to Actual Construction

34.5m³ of SUSMICS-C containing 60kg/m³ of biochar and BFS cement type B (BB, JIS R 5211) was applied to the temporary concrete pavement for construction of a road surface. When compared to normal concrete, it was confirmed that it had reduced CO₂ emissions by 99% and that workability and quality of finished surface were equivalent to those of normal concrete. This proves that SUSMICS-C can be applied in the construction of actual structures.



Concrete placing



Finished surface after construction