

#SUSTAINABILITY

'Ultra-Green' Concrete

Researchers want to alter the formulation of concrete by adopting an "ultra-green concrete" approach.



Concrete is the most widely used building material worldwide, providing a foundation of our modern society's infrastructure. It is partially recyclable and can even absorb CO2 from the atmosphere during the curing process. However, the amount of CO2 released during the manufacturing process far exceeds the amount that can be reabsorbed later. This is why the concrete industry generates around 8% of global CO2 emissions—more than the aviation and shipping industry combined. Franco Zunino, a senior scientist at the Institute for Building Materials at ETH Zurich, hopes to change that with a new project.

Two-Fold strategy for better concrete

Concrete consists of a mixture of cement, aggregates, and water. Traditional cement is composed of about 95% clinker and 5% gypsum. To produce cement, limestone and clay are burned into clinker in a kiln, heated to 1,450°Celsius (about 2,642 Fahrenheit), which inevitably releases CO2 due to chemical decomposition of limestone. The huge amount of energy required by the kiln further worsens cement's carbon footprint.

ETH Zurich has already launched its Limestone Calined Clay Cements (LCC) project, in which Zunino is actively involved and which has set a new standard in cement production. It has developed a cement formulation using 50% clinker and a combination of calcined clay and limestone that has cut CO2 emissions by around 40%.

However, improving the formulation of concrete can bring about a significant increase in these environmental benefits. This is where Zunino's Ultra-Green Concrete (UGC) project at the ETH civil, environmental, and geomatic engineering department (D-BAUG) comes in. Zunino pursues a two-fold strategy for the new green concrete: first, reducing clinker content, i.e. the amount of clinker per unit of cement; second, lowering the ratio of cement in the concrete. This dual strategy offers flexibility in tailoring low-carbon concrete compositions to individual markets. "The ideal would be to implement both at the same time but the individual com-

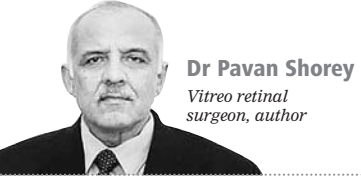
ponents are independent of each other. In some markets, it may be difficult to implement both aspects of the dual strategy, as production capacity and infrastructure need to be put in place. However, it is possible to implement at least one of them and still reduce CO2 emissions," Zunino says.

One reason for the reluctance might be that the concrete industry is not particularly innovative. Concrete has proven to be highly successful due to its cost-effectiveness, safety, and being user-friendly. According to Zunino, "Green Concrete" could be even cheaper than conventional concrete. The proportion of expensive components is lower, while the quality and thus price of the concrete remain the same. This creates financial incentives for using more environmental friendly material.

"Safety aspects are also important, of course," Zunino says

"Anyone who builds a house wants to use a material that ensures that it will stand for a hundred years. But we have to ask ourselves whether this really makes sense, in view of the enormous CO2 emissions involved. Can we instead use a material that meets the structure's required life cycle but emits significantly less CO2? In a climate-emissions scenario, one tonne of CO2 saved today is more valuable than the same tonne saved in 50 years."

We, Mothers, caught in the crossfire



Dr Pavan Shorey
Vitreo retinal surgeon, author

The Israeli- Hamas/ Palestine conflict is already a devastating human tragedy. The beinous killing of innocent people by Hamas deserves the severest condemnation. In all this, it is the civilian population which is bearing the consequences. Here are a series of poems on the conflict. Two poems are from the Israeli point of view and two are from the Palestinian point of

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#POEMS

The unifying poem is, 'We, Mothers, caught in the crossfire.' It is based on interviews by Parent Circle, a grassroots organisation, trying for a process of reconciliation between mothers on both sides of the fence, who are unable to cope with the loss of their children in this ongoing saga of violence. The poem, Burning Conscience, is based on interviews given by former soldiers of IDF, who have formed an organisation of the same name. They call out the lies of the Israeli

Army, the Israeli Government and the Israeli press. Martin Luther King famously said, "Violence corrupts the soul." Both sides have their souls corrupted and they don't care. Hamas must know that violence begets violence and the only path forward is peace and negotiations. Israel must know that it can erase a race but it cannot erase the idea of a free Palestinian state.



World Television Day

On December 1996, the United Nations General Assembly proclaimed the 21st of November as World Television Day, the same year the first World Television Forum was held. According to the United Nations, this decision was taken in order to give recognition to the increasing impact television has had on decision making by bringing making issues conflicts and threats to peace and security, to the world's attention. World Television Day is rather a celebration of the philosophy which it represents—a philosophy of openness and transparency of world issues.



#AFFORESTATION

A Biodiversity Boost

The forest carbon potential has been a highly controversial topic.



Natural forest recovery can capture approximately 226 gigatonnes of carbon, but only if we also reduce greenhouse gas emissions, a new study shows. The study highlights the critical importance of forest conservation, restoration, and sustainable management in moving towards international climate and biodiversity targets.

The researchers stress that this potential can be achieved by incentivizing community-driven efforts to promote biodiversity. The forest carbon potential has been a highly controversial topic. Four years ago, a study published in the journal Science found that the restoration of forests can capture over 200 gigatonnes of carbon—which could draw down approximately 30% of excess anthropogenic carbon. While this study elevated a discussion about the role of nature in fighting climate change, it also raised concerns around the adverse environmental impacts of mass tree plantations, carbon offsetting schemes, and greenwashing. While some scientific studies have supported the scale of this finding, others argued that this forest carbon estimate could be up to 4 or 5 times too high.

To address this controversial topic, researchers led by the Crowther Lab at ETH Zurich joined forces to build an integrated assessment using a comprehensive range of approaches, including vast ground-sourced data and satellite data. Of course, much of this land is used for extensive human development including urban and agricultural land. However, outside of those areas, researchers found that forests could capture approximately 226 Gt in regions with a low human footprint, if they were allowed to recover. Approximately 61% of this potential can be achieved by protecting existing forests, so that they can recover to maturity. The remaining 39% can be achieved by reconnecting fragmented forest

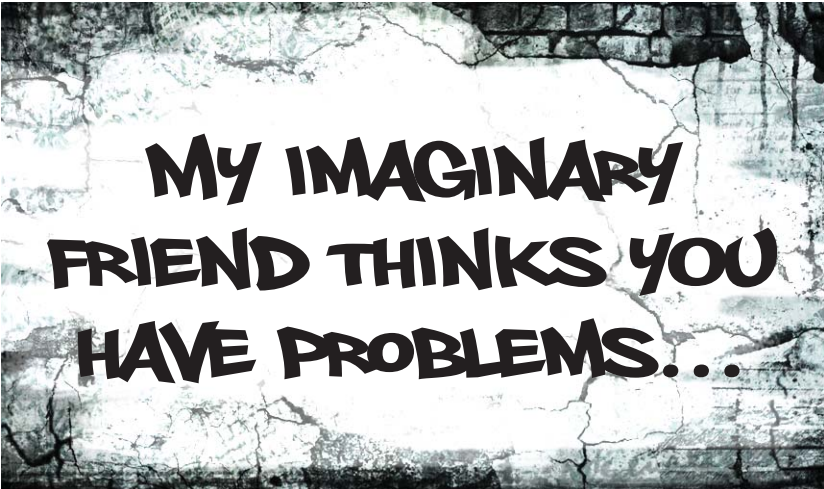


landscapes through sustainable management and restoration. "Most of the world's forests are highly degraded. In fact, many people have never been in one of the few old growth forests that remain on Earth," says Lidong Mo, a lead author of the study published in the journal Nature. "To restore global biodiversity, ending deforestation must be a top priority." The dataset revealed that biodiversity accounts for approximately half of the global forest productivity. As such, the researchers highlighted that, to achieve the full carbon potential, restoration efforts should include a natural diversity of species. In addition, sustainable agricultural, forestry, and restoration practices that promote biodiversity have the greatest potential for carbon capture.

'A Fundamentally Social Endeavour'

The authors stress that responsible restoration is a fundamentally social endeavour. It includes countless actions such as conservation, natural regeneration, rewilding, silviculture, agroforestry, and all other community-driven efforts to promote biodiversity. It requires equitable development, driven by policies that prioritize the rights of local communities and Indigenous people. "We need to redefine what restoration means to many people," says senior author Thomas Crowther, a professor at ETH Zurich. "Restoration is not about mass tree plantations to offset carbon

THE WALL



BABY BLUES



By Rick Kirkman & Jerry Scott

ZITS



By Jerry Scott & Jim Borgman