Concrete4Change, helping the construction industry achieve net-zero

As part of our quick founder questions series - or QFQs - we spoke to Dalraj Nijjar, cofounder & CCO at Concrete4Change about transferring CO2 into concrete, building a team and chemistry.

Temps de lecture : minute

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Our CEO Prof. Sid Pourfalah has been working in the construction and concrete industries for over 20 years now, and he's been passionate about sustainable solutions during that period. With our CTO Michael Wise, together they came up with the idea of creating a material (or 'carrier') that can transfer CO2 into concrete to make it lower emission and stronger.

Other companies have tried to sequester CO2 into concrete via different methods, but in exploring the different methods, my co-founders stumbled upon this principle method that was simple yet so differentiated and unique in the wider space of concrete decarbonisation technologies.

Once we began sharing this idea with big names in the industry, it resonated with them immediately helping us validate problem-solution fit, from that point we knew we were on to something special.

Tell us about the business – what it is, what it

aims to achieve, who you work with, how you reach customers and so on?

Concrete4Change is an advanced materials startup developing ground-breaking technology that mineralises CO2 into the cement in concrete – making concrete stronger, lower emission and cheaper all at the same time. The approach involves developing 'carrier' materials that can absorb CO2 from industrial processes (primarily taking CO2 emitted from cement production), and when mixed in concrete as a small additive, they release and mineralise CO2 – meaning permanent CO2 removal. By carbonating the cement, we can make the concrete stronger – if we do this, then we can reduce the amount of cement required in a concrete mix, as the extra strength is typically not required. Cement is 80% of the price and 90% of the emission within concrete production. This approach is completely unique in the market and provides a cost-effective and seamless route to help the cement/concrete industries utilise the CO2 they produce in their concrete. Apart from storing captured CO2 underground, there are little other routes available to the industry at present which provide the circularity and potential emission reduction and cost reduction impact that C4C's technology can provide. Furthermore, as the C4C carrier material is designed to be an additive to concrete (no more than 1% of concrete by mass) it adheres to regulatory requirements with no need for specific approvals. There's no change to concrete production processes with the C4C carrier.

We develop and iterate different carrier formulations in house at our laboratory, setting up one of the most advanced carbon capture and cement chemistry labs in the world. Previously, we've run lab-scale trials with the likes of Goldbeck, Siam Cement Group and Heidelberg Materials and now our 1st generation of carrier is now being scaled up and trialled with the largest cement and concrete manufacturers in the world.

To date we've leveraged our industry network to develop our relationships with customers and combined this with targeted direct outreach to key stakeholders within our customer's organisations. C4C principally is looking to co-create value with its customer (the cement/concrete manufacturer). C4C's leading R&D expertise and unique IP works seamlessly in tandem with the concrete industry's existing manufacturing capabilities.

How has the business evolved since its launch?

The company launched in June 2021. At the beginning we utilised laboratories at universities to conduct proof of concepts and initial demonstrations. This helped us secure the first tranches of grant funding and our pre-seed round. Given our fast-paced and iterative development approach, we moved into our own premises in November 2022, developing our own chemistry and concrete labs from scratch, bringing all the capabilities we required in house.

In 2023, we then completed our seed round which has helped expand our team size to 14, and accelerate development of our top performing carrier materials.

Going into this current year of 2024, we've been finalising our 'labcrete' – testing our carrier in cement continuously to verify and characterise the positive impacts the carrier can have in cementitious environments.

Our initial idea on the business model itself was centred around the selling of carbon offsets as the main source of potential future revenue. However, upon consultation with customers and industry stakeholders at large, this is now not an attractive route, and a more conventional product sales route will be taken, particularly now given the cost reduction impact that the carrier can have on a concrete mix. We're

working closely with customers through this next phase to both trial the technology in pilot environments and in parallel, verifying unit economics and process flows.

Tell us about the working culture at Concrete4Change

I would characterise it using the following words - merit, rigour, excellence, humour and intelligence.

Each of the team works incredibly hard, and we actively reward those that do. This is the minimum requirement. Further, we try to be rigorous and accurate in everything we do. Yes, mistakes will happen and that’s no problem, but we do not let them fester, repeat, or escalate – we all learn try to learn quickly and continuously improve. The rate of change in a startup is very high, so our rate of improvement should exceed that.

We must be the best at what we do, otherwise we will not succeed. That being said, we try not to take ourselves so seriously, and there’s a genuine humility across the whole group which means that everyone gets along and is easy to work with.

We encourage tough debate and justified arguments. If you’re going to argue a point be prepared with evidence, data or some solid reasoning. Through this ‘sparring’ if you will, we generate the best ideas and routes forward.

Finally, we supply free food, snacks, hot and cold drinks in the office so that our team has one less thing to worry about. At least once or twice a month we organise a team lunch or dinner to celebrate a milestone.

How are you funded?

We've raised £4.5M to date; *£3M of which has come from venture capital via pre-seed and seed rounds*. The remaining £1.5M has come from non-dilutive grant funding from UK bodies such as Innovate UK and the Department of Energy Security and Net-Zero.

Presently we are pre-revenue, but we are aiming to begin revenue generation through sales of carrier material by mid-2026.

What has been your biggest challenge so far and how have you overcome this?

Recruitment of talent has been the biggest challenge. Given the niche nature of our work which is at the intersection of carbon capture, materials chemistry and concrete engineering, it has been tough to find talent with both the academic prowess and commercial mindset to work in a startup like C4C.

We've optimised our recruitment processes in order to find the best available talent, but we need more talented people to join and we're constantly on the lookout for them.

How does Concrete4Change answer an unmet need?

The cement and concrete industries produce emits 3 billion tonnes of CO_2 every year and doesn't know how to use it. With C4C's technology we can utilise that CO_2 – and via the carrier – sequester the CO_2 into their concrete.

The challenge of introducing CO_2 into concrete is a chemistry challenge.

No commercial entity has solved this cement chemistry challenge until C4C. Many of the existing cement and concrete manufacturers have tried to develop CO2 sequestration technologies, but largely have failed to develop anything that can do the job effectively. This is where Concrete4Change comes in, helping them turning this emission problem into an emission solution.

What's in store for the future?

We're conducting trials of our technology with future customers both in our lab and at the production sites over the next 3 to 6 months, leading to pre-order/offtake agreements with these customers.

That sets us up very well for our Series A in 2025, whereby that round will propel our 1st generation carrier technology from the lab/pilot scale to the industrial scale. With that raise, we will be able to develop internal carrier production capability that will service our first set of customers.

What one piece of advice would you give other founders or future founders?

Keep the main thing, the main thing. Don't get distracted by non-critical tasks. Understand what moves the needle in your company and optimise for that. It is genuinely impressive what long periods of targeted focus can achieve if done correctly.

For future founders, understand the problem space you're looking at in depth before attacking it with an idea or new POC. Be sure that you know you have founder-market fit before attempting. If you don't have it, I recommend working for another startup in an area that interests you, working for them and learning as much as you can in the process – at least that would be what I would advise my 22-year-old self if I had the chance.

And finally, a more personal question! What's your daily routine and the rules you're living by at the moment?

So I'm a keen weight trainer and have been lifting weights in the gym for over 10 years. On the days I train, I wake up at 4:45am, slowly roll out of bed, get my training clothes on, get my food and laptop ready and get to the gym for 5:45am. I'll train for roughly 1 hour, get ready for the day, and leave the gym at 7:10am and my commute to the office is 1 hour, so I get to the office for around 8:15am

I'll typically then work through till 6:30pm and have a quick lunch break and tea break in those hours. I then get back home by 7:30pm. I'll have dinner by 8pm and start winding down for the day. Any other 'life admin' gets done in the following hour between 8:30pm to 9:30pm. After that I'm pretty tired by this point, so I'm getting ready for bed, and asleep by 10 to 10:30pm.

I work 3 to 4 hours on both Saturday and Sunday, catching up on any non-urgent tasks.

I try to keep my own rules quite simple:

Work as hard as I can every day and never give in.

Treat people with respect

A healthy body leads to a healthy mind.

Dalraj Nijjar is the cofounder & Chief Commercial Officer at *Concrete4Change*.

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