

Transcript

Interview with Lindsay McDougall, Drive, ABC Illawarra

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Lindsay McDougall: It is time to talk about concrete. As an essential part of today's infrastructure, easily cast into any shape, load-bearing and quick to set, it is used in construction from holding a post into the ground to superstructures like roads, bridges, and dams. But, the most commonly used cement in concrete, Ordinary Portland Cement, is far from a perfect product. There are environmental and health concerns. A new version of concrete that has recently been developed, could shake up the construction industry in an historic way. David Chuter, CEO and Managing Director of the Innovative Manufacturing CRC (IMCRC) joins us now.

Hi, David, how are you? Did you enjoy a little bit of the Billy Thorpe cover that was playing before we started chatting?

David Chuter: Yes, I did. I am just concerned that you might have lost a few people to Facebook, looking for Jimmy Barns. And they are not interested in concrete.

Lindsay McDougall: Trust me if they are Jimmy Barns fans, they are fans of concrete as well. He has a similar Well, he has a gravelly voice. His voice is probably one of the main ingredients in concrete. Let us say that for today as I have started learning a lot about concrete.

But for those who don't know, before we get into this new whiz bang concrete, what is concrete normally made of?

David Chuter: Most of us would have poured concrete at home or seen it on building sites. It is basically made up of sand and a substance that allows it to cement, in other words to solidify, when you add water. The material that helps concrete to solidify is cement, which is actually not very friendly on the environment. Its manufacturing process contributes, as I understand it, to more than 5% of carbon dioxide emissions around the world. When you think about it, that is a really big number and a great opportunity. This problem is being solved by an Australian company, supported by a local Australian company here in the region as well as an Australian university. This is exactly the kind of thing we want to hear a lot more of as we will tackle COVID.

Lindsay McDougall: Absolutely. Lots of innovation in a year when we need that kind of thing. What is so carbon intensive with the old way of making concrete?

David Chuter: I guess, the emissions that are being delivered. The CO2 that is created during the manufacturing process of the various constituents. And up till now, there haven't been many alternatives. There are other materials that you can mix in, but they create other challenges. They are very heat-intensive, very energy-intensive to manufacture. There are some health and safety concerns. This project that we are co-investing in, is being led by Boral and the work is done by the University of Technology Sydney (UTS) in their tech lab. More importantly, they are working with small and medium Australian businesses, including one here in the Mittagong region. They are looking to test, how well this new form of concrete can work in the real world. Because, there is no point developing something in a laboratory, if it does not work in the real world, and you can't sell it.

Lindsay McDougall: All right. So, what makes this new material so special? What is the difference?

David Chuter: Well, one of the differences is that it uses less energy. It emits less carbon dioxide in the manufacturing process. But one other benefit is, that it is using materials that are by-products of other processes. So, it is using products such as fly ash, or by-products of casting in the steel industry - iron ore and steel production. We are seeing this will move into - one of the phrases you might have heard is circular economy. Effectively, what this process is doing, it is taking by-products from one manufacturing process or ecosystem and using those (which normally would have gone to waste) as input to make something new. In other words, you are constantly returning (reusing) products and materials to create new things that you can then sell again. This solves a range of problems. The idea is to create a concrete that performs as well as if not better, but leaves a much smaller impact on the

environment, uses less energy and is a great Australian invention that can be taken into the world of concrete producers everywhere.

Lindsay McDougall: In the agricultural industry, the remains of making beer or making coffee, the coffee ground, go back into stock feed. In fact, there are companies that have a zero net sum because the emissions / leftovers from making beer go into the stock feed which then is sold back to the restaurants that are selling that beer. This is a long way to say that it is kind of similar in this industry. BlueScope Steel probably has a lot of by-products, which could then be made into this new cement for making concrete.

David Chuter: Absolutely. It is a win-win for everybody involved. There is less material that is going to waste. Ultimately, it is creating industry and technology in Australia, particularly in regional areas where it will also create jobs. And the good thing about concrete, I have learned a lot since we have invested in this project ... I do know what rebar is, for example.

Lindsay McDougall: Which is important when you are making bridges, apparently.

David Chuter: Yes, hugely important when you are building bridges.

Do you know that you can also 3D print concrete? You can build up shapes by layering patterns in concrete. This is a new way in which you can quickly build everything from houses to commercial buildings, and create new designs? It is fascinating. Because concrete is one product that, as soon as you mix it together, will set. You therefore have to make it locally, where you are going to use it. That is why, this is a great opportunity for regional manufacturing in Australia, and the more traditional manufacturing sites. Hence why, it is an opportunity for local jobs. Projects and innovation can also take place in the regions.

Lindsay McDougall: What is happening with the testing in Mittagong? How close are we to test how this new stuff works?

David Chuter: That is a good question. This is a two-year project which we just kicked off. There is other testing that needs to be done beforehand, to make sure that industry can work with it. It meets the strength requirements, it mixes properly... Southern Highland Concrete, which is the company that Boral has chosen to work with, will test the concrete in real world applications. They will mould things with it, make things with it and give feedback to Boral about its usability in a real world. This will then help Boral to finetune the product as they take it to market. And, this is all being done working with, as I said before, UTS in Sydney. The project brings together the smart people from universities who have the equipment and the facilities, the ideas and investment from companies like Boral, and the small and medium businesses out there. Southern Highlands Concrete is only one of the small and medium businesses that Boral is engaging in this project. And then, you have our organisation, IMCRC, which brings it all together. We match Boral's cash investment. Effectively, we double up the cash, we reinvest taxpayers money, picking projects that are going to drive jobs, innovation and sector growth in Australia.

Lindsay McDougall: How does it work? How does research and development programs on these materials work? Does the university approach a manufacturer and say "Hey, we've got something you might like to try out" or does the manufacturer go to the lab and ask them to find a better way to do things? Who is kind of doing the leading in this dance?

David Chuter: It can happen a number of different ways. I mean, the dance floor is a good analogy. Sometimes these are just chance meetings. You happen to strike up a conversation with someone who looks interesting. And all of a sudden, you find that you can actually dance really well together.

We have over 30 projects like this one that we are co-investing in across Australia. Some projects are designed by companies that will find the right university partner to work with. In other cases, the university might have developed new technology that has not found a home yet. They have not been able to commercialise it and they are looking for companies that can take the idea forward. These are collaborative projects, which take place not just in university facilities but in companies, where they are working with customers. Ultimately, you can do all the research you want in the lab, but the proof is in taking it out to market. That is where the jobs and growth will come.

Lindsay McDougall: Some of those projects include by the looks of things shipbuilding via virtual reality and using kangaroo tendons as a substitute for ligament reconstruction. It goes quite broad.

David Chuter: Yes. We even have projects that are looking at COVID type solutions. We were working on anti-microbial solutions well before COVID came along. And again, in regional areas. We are working with a company called Whitely Corporation up in the Hunter Valley. They are working with the University of Sydney. They have grown so much in the last few months; they cannot build their new factory fast enough. This shows that there are great opportunities for regional companies, great opportunities around manufacturing. And the key thing about manufacturing is that the jobs are not just about making the product. Someone has designed it, someone is moving the product, someone works in logistics, someone is involved in marketing. For every job in manufacturing, there is a whole range of other opportunities. Manufacturing is much broader than just making things.

Lindsay McDougall: Coming back to this new concrete, using a different kind of cement. This is a two-year project. I guess the questions are: Does it pour the same way? Is it adjustable, shapeable, mouldable, not mouldable but shapeable? Is it still as load bearing, you know? Are there any health effects? Will all these things go into the testing? Are there any ideas of how that stuff is all looking at the moment?

David Chuter: All of that will be part of the testing. But the other important part is the business case which will also be assessed. It is really about understanding: Which markets? Which type of applications? What will this cost? What environmental benefits will it provide? What job opportunities can it provide? This is all part of the project that takes place. It is both, a technology project but also about understanding the business opportunities to make sure this will be successful.

Lindsay McDougall: David Chuter. It was good to talk to you. Thank you very much.

David Chuter: My pleasure. Thank you for having me.