



Concrete Chemistry

Chris Munn will be a familiar face to many in the concrete construction world. Recently appointed as Concrete Technologist at CCANZ, he can draw on experience from both sides of the industry fence, in a career that has spanned the practical and the theoretical. He talked to Ann Clifford.

Chris has an impressive concrete pedigree: the only New Zealander to have graduated with a Diploma in Advanced Concrete Technology from the United Kingdom, in the 1970s and 80s he spent nearly 10 years working for the (then) NZ Concrete Research Association, followed by 15 plus years in contracting.

While he has a broad knowledge of the industry as a whole, his specialist subject is how concrete works - what Chris describes as “the fairly simple laws of physics and chemistry” that define the reactions that take place when concrete is made. “There is a lot of chemistry in concrete. While there is the old cliché about rocket science, the chemical reaction for ‘rocket science’ (or rocket fuel burning) is actually just $H + 2O$, which gives water. But you could fill a page about the chemical reactions of cement hydration. Because it is done all the time, people don’t even think of it as a chemical thing; they think of it as concrete drying. But in actual fact, it is concrete hydrating, and it is a complicated topic.”

As a career choice, it was accident rather than design that brought Chris to concrete - but his fascination with the product is still evident after years in the business. He’d always had, he says, an interest in chemistry and materials, and after school ended up at Wellington Polytechnic studying for an NZCS in chemistry.

At the time he was employed by the Ministry of Works doing hydrological

work, “being paid to go out tramping into the bush to read rain gauges and muck around on motorcycles”. He was only spurred to leave when he discovered it wouldn’t count as work-related experience for his NZCS - and ended up applying for a job at the Concrete Research Association, where in due course he was employed as a research technician.

It didn’t take him long to work out where his future might lie: “My first day there I grabbed hold of a book on cement and concrete chemistry, which was something that was never really taught at the Polytech - it was glossed over as something very complicated and complex, something you didn’t really want to know about. I started reading this book - I think it was Lees’ Chemistry of Cement, bit of a reference really - and that got me interested in it.”

By the time Chris was offered the chance to study in the United Kingdom some years later, he’d garnered a fair bit of knowledge. But the English wouldn’t recognise his experience, and before he could take on the Advanced Diploma of Concrete Technology he had to do a couple of City and Guilds courses. He has a typically dry view of the experience, which involved 70 or 80 assignments over a year and a half “before they realised that I did know what a bag of cement looks like”.

The Diploma was run out of the British Cement and Concrete Association’s then HQ, at Wrexham Springs. Chris,

undaunted by the financial side of things, organised a grant from the Royal Society along with Prince of Wales' and Technician's Study Awards. The entire family - Chris, his wife and three children - then packed up and moved to Watford, "a real cultural experience for us".

A six-month work placement at Cementation Research was part of the programme, researching the cement and silica fume rheology of cement pastes. It was sister company Cementation Mining in Maltby, though, that provided the highlight: "A shaft was being sunk down to a coal seam over a kilometre below the surface. They were free-falling concrete a kilometre down a pipe into forms to case the sides of the thing - it was the most amazing thing I've ever seen."

Back in New Zealand, Chris was itching to put his newly acquired knowledge to use, and made the jump into contracting with Construction Techniques. It was, he says, a big change, but his UK experience fitted in well: cathodic protection and mixed design technology were two areas he'd been exposed to that were then new for the local market.

"At that stage the repair industry was undergoing fairly rapid development as well; companies were starting to bring new materials on board, and it was quite technical. Previously the concrete material and the repair materials were never thought of as a homogenous blend.

"The repair industry operators in New Zealand are great ones for thinking up alternatives... an engineer will specify a system and every contractor worth his salt will turn that idea inside out to try to find an alternative to do it cheaper and smarter. That usually means pushing materials to the limit or finding alternative ways to minimise material costs and maximise profit - which is what it is all about."

He believes New Zealanders are also experts at trawling the world for the best products to bring back home - and has even had a go at it himself. In the late 1990s he went to work for GK Shaw, setting up a remedial engineering operation and bringing a new product Helifix - a masonry/brick strengthening system - into the country, with the idea of applying it to concrete masonry as well. The system was successful, but Chris found himself slowly moving out of the concrete side of things. "I was doing all the timber and brick stuff, and it didn't really appeal."

So he's come full circle, back to where he started - this time around it is the Cement and Concrete Association which has grown out of the earlier Research Association, and not only the organisation but the world has changed in the intervening years.

"The challenge is to make sure that as the industry develops and things change, the material is used in an appropriate manner and is understood. If you can do that you've cracked it. Repairs and strengthening are a classic example... we are using technologies now that weren't available 20 years ago. The composite materials used for strengthening concrete are spin-offs from high-tech space development and marine technology, and the construction industry needs to take on board the things that go along with that."

As Concrete Technologist, Chris will be answering technical queries, writing Building Comfortable Homes - a follow-up to the Designing Comfortable Homes book which is due out in April next year, and getting involved with Standards and industry liaison groups. "We need to keep in touch with industry, find out what their problems are and where we can help. Education of course is one of the big issues for us. I'll be helping set up training courses, and we're planning lunchtime seminars with organisations."

Chris Munn is obviously someone who is in for the long haul. Years after he reluctantly gave up that job at the Ministry of Works he's still a keen tramper - this summer he and his wife are planning to tackle the nine-day Dusky Sound Track in Fiordland. And in office hours, the concrete chemistry is still fizzing.

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