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MESSAGE FROM THE PRESIDENT
Kia ora readymixers,

Welcome to latest NZRMCA Newsletter:

We are already at the mid-point of the year; a fact brought home by the recent cold weather and associated concrete placing challenges.

The transition from June to July marks the beginning of a new operational year for the NZRMCA, and therefore a fresh Business Plan.

The organisation’s work programme will again address technical and advocacy needs, along with networking opportunities for members.

The Plant Audit Scheme will be supported in 2015/16 with a targeted communication plan designed to raise awareness of the Scheme’s value amongst the engineering and compliance community.

The recent issue of low-strength concrete production in Auckland, and its identification, reinforces the importance of robust quality assurance programmes, which are independently validated by the Scheme. However, we must all strive for continued vigilance in ensuring the product we supply complies with NZ Standards at all times.

The latest production figures make for interesting reading (see page 5), particularly as while the nationwide March quarter figure from 2014 and 2015 has increased, along with the annual total to March from 2014 to 2015, there has been an overall drop in production over the last two quarters.

The 2015 Concrete Conference is approaching fast. Once again the NZRMCA will have three con-current sessions (see page 3). I urge you to register as the technical programme is extremely interesting.

I will finish on a sad note by acknowledging the passing of Bruce Tait, a Honourary Life Member of the Association. Bruce was actively involved over many years in a range of concrete related organisations. His loss will be felt by many in our industry.

Brian Godfrey
NZRMCA President

BRUCE TAIT - HONOURARY LIFE MEMBER FAREWELLED
NZRMCA Honourary Life Member Bruce Tait passed away on 26 February 2015 after a short illness.

Bruce qualified as a civil engineer from Canterbury University and spent several years with the Ministry of Works on the Waikato hydro dams.

He later joined Cementation Ltd and worked overseas in the Middle East and Australia.

He joined the NZ Portland Cement Association in 1974 as Assistant General Manager; first to Monte Craven and then Jack Garside. He was himself appointed General Manager in 1980. With the formation of the Cement and Concrete Association in 1988 he was appointed to the position of Special Projects Engineer where he looked at specific projects mainly on roading and paving. He also retained his position with the NZ Portland Cement Association.

Over the years Bruce wrote many papers on cement stabilisation, paving and roading in general. He was also very active in the NZRMCA, being Secretary, and involved in the Classification Committee, including as its Chairman.

Although Bruce retired from full-time employment in 1991, he was contracted by the Cement & Concrete Association to undertake its secretarial servicing of the NZRMCA for a number of years.

Bruce was married to Joan and had three children. His hobbies included making leadlight lampshades and golf.

Bruce’s sense of humour was legendary across the industry, as was his dedication and loyalty.

Cover image: Virgin Concrete, Kama, Whangarei.
2015 CONFERENCE BRINGS PLENTY OF VARIETY

Planning for this year’s conference is almost complete and the organisers say the new venue is perfectly geared to the diverse range of activities scheduled for the three-day event.

The conference (Thursday 8th to Saturday 10th October) is to be held at Rotorua’s Sir Howard Morrison Performing Arts Centre (previously the Rotorua Convention Centre).

Conference organising chairman Jeff Matthews says the event’s programme has been designed to maximise the technical content but also to provide networking opportunities. These include a casual party on the Thursday evening and social activities on Friday afternoon – and the formal conference dinner and awards night on Friday evening.

“The technical presentations in particular are generating enormous interest. We received nearly 50 papers for consideration and selecting those to be delivered was one of our more difficult tasks. I can confirm that the topics are remarkably diverse.”

One paper that’s sure to be of interest is a reflection on the lives of three world leaders in Reinforced Concrete Design – Professors Paulay, Park and Priestley.

NZRMCA President and organising committee member Brian Godfrey echoes these sentiments, emphasising that from a ready mixed concrete perspective the technical programme offers something for everyone in 2015.

“We have endeavoured to select a range of papers that address technical considerations in terms of ready mixed concrete production, as well as more business focussed papers,” says Brian. “For example, we have papers on challenging projects and material issues, along with health and safety and competition law.”

THE VENUE

The Sir Howard Morrison Performing Arts Centre is located in Rotorua’s downtown business and retail area. Hotels, shops, bars, restaurants and the lakefront are only minutes away.

Specifically designed for conferences, exhibitions and trade shows, the Centre features a 686-seat auditorium, a fully-acoustic concert chamber, a banquet room, mezzanine floor area, a multifunctional foyer and four breakout rooms.

TRADE EXHIBITION

As in previous events, this year’s event incorporates an extensive trade exhibition over the three days. Exhibitors are hosting all the morning/ afternoon teas, the lunches and the pre-dinner drink functions.

In effect, says Jeff, the conference gives companies an excellent opportunity to present their products and services to some 400 decision makers.

NZRMCA TECHNICAL PROGRAMME

THURSDAY 8 OCTOBER 2015
3.30 pm – 5.00 pm: Session 2A
Chairman: Brian Godfrey
• Domain Off-Ramp Bridge - Remediation of a Fire Damaged Bridge
  - Greg Cooper - Tauranga Eastern Link Construction Alliance; Neil Lee - Opus Research; Andrew Walker - Opus Auckland
• UPDATE - Industry Association Consolidation
  - Rob Gainster - CCANZ
• NZRMCA AGM

FRIDAY 9 OCTOBER 2015
10.45 am – 12.30 pm: Session 4A
Chairman: Scott Williams
• Improving Safety Culture Through Leadership
  - Michael Gebbie - HW Richardson Group
• Training for Success in the Cement and Concrete Industries
  - Greg Durkin - BCITO
• JPL Distribution Centre - World Leading Concrete Flooring
  - Tim Walker - Conslab
• Competition and Consumer Law - Understanding Anti-Competitive Behaviour
  - Nicky Beechey - Commerce Commission

SATURDAY 10 OCTOBER 2015
8.30 am - 10.00 am: Session 5A
Chairman: Paul Donoghue
• The Commercial Argument for Revising NZS 3104 (The Concrete Production Standard)
  - Chris Munn - Allied Concrete
• Effects of Waste Glass on Strength and Durability Characteristics of Self-Compacting Concrete
  - Samia Ali / Allan Scott - University of Canterbury; James Mackenzie - Allied Concrete
• The Modelling, Monitoring and Control of Heat of Hydration in the Majestic Centre Transfer Beam
  - Alastair Bennett - Firth; Dan Edwards - Fletcher Construction
• The Design and Construction of a Cast In situ Concrete Helical Staircase
  - Sandy Hall - Sullivan Hall Consultants; Ross Bannan - Bannan Construction

REGISTRATION AND ACCOMMODATION

Registration for the conference is now open. As in past years, the conference has made block bookings at hotels, all within easy distance of the conference venue. These will be available to book as part of your online registration.

Visit the Conference website for more details – www.theconcreteconference.co.nz
NZRMCA AT THE BUILDING OFFICIALS EXPO

NZRMCA and CCANZ shared an exhibitor’s space at the recent Building Officials Institute of New Zealand (BOINZ) 2015 Conference and Expo at SKYCITY Convention Centre in Auckland 19-22 April.

The focus of the NZRMCA presence over the three day event was to raise awareness of the Plant Audit Scheme, as well as the NZRMCA brand.

Attended by approximately 200 delegates the 2015 event was considered a success by organisers, who were keen to point out that the exhibitors’ space was over subscribed.

Along with the Plant Audit Scheme delegates also showed an interest in the NZRMCA driver training DVD, in particular the Environmental section.

Sharing costs with CCANZ seems to be a sensible way forward to reach this important group of stakeholders on a biennial basis.

NZS 3121 FULL REVISION

The scheduled amendment to NZS 3121 Specification for Water and Aggregate for Concrete has become a revision due to the large number of changes required to make it fit for purpose and to reflect current best practice.

The Committee established to review this Standard recommended to Standards New Zealand that to account for advances in current practice as well as changes over the past decade to the NZ Building Act and to NZS 3101 Concrete Structures Standard, NZS 3121 should be revised rather than amended.

The Standard gives essential requirements for water and aggregates, other than lightweight aggregates, suitable for use as materials for making concrete to meet normal structural and durability requirements.

This expansion in scope has pushed out the timetable; however a draft for public comment is currently available from the Standards New Zealand website – www.standards.co.nz.

NZRMCA CONCRETE BOWL BEST PRACTICE

The NZRMCA has developed a (draft) best practice document covering concrete bowl connection points and secondary retaining mechanisms.

The decision to draft the short document was taken following the relatively recent detachment of a concrete bowl from a truck negotiating a corner at low speed in Auckland.

Incident investigations identified failure of the bolts securing the bowl as the primary cause of the detachment. This rare incident also gave rise to discussions around the advantages / disadvantages of secondary retaining mechanisms to reduce the likelihood of bowl detachment during a low speed event.

As such, the document covers the development (or revision) of concrete truck maintenance plans to include concrete mixer bowl connection points.

A secondary retaining mechanism is also considered.

Feedback on the draft is sought by 31 July 2015. A copy can be requested from the NZRMCA Executive Officer – adam@ccanz.org.nz.

CONSULTATION ON RESPIRABLE QUARTZ (CRYSTALLINE SILICA)

Worksafe New Zealand is proposing to modify the Workplace Exposure Standard for respirable quartz (crystalline silica).

Worksafe proposes to adopt an 8 hour time weighted average (WES-TWA) of 0.025mg/m^3 (measured as respirable fraction).

A review was performed recently to recommend a proposed WES value. This review was carried out by Toxicology Excellence for Risk Assessment (TERA) in the United States.

The NZRMCA Technical Committee and CCANZ will review the document to assess its relevance to the concrete industry. Individual companies may wish to do the same.

The deadline for response is 5pm Friday 7th August 2015. The document can be downloaded from the Worksafe New Zealand website - www.business.govt.nz/worksafe.
READY MIXED CONCRETE PRODUCTION

Across New Zealand ready mixed concrete production increased approximately 11% from the March quarter in 2014 to that in 2015.

The percentage increase from the annual total to March 2014 compared with the annual total to March 2015 was around 15%.

From a regional perspective, increases have been positive nationwide from the March quarter in 2014 to that in 2015, without exception. This has not happened for a number of quarters, and is good news for the Hawkes Bay & Gisborne and West Coast, Nelson & Marlborough regions.

However, in terms of production output for the annual total to March 2015 compared with the annual total to March 2014, these regions experienced percent decreases of around 7% and 21% respectively.

The metropolitan areas of Auckland, Wellington and Christchurch experienced a steady upwards trend in production from the March quarter in 2014 to that in 2015 of between 10% and 14%.

Once again Christchurch enjoyed the largest percentage increase in production for the annual total to March 2015 compared with the annual total to March 2014 at around 21%. Auckland followed with a 14% increase in production, while Wellington dropped by 1%.

Looking back over the previous 2 years a general upswing in nationwide production output over a four quarter average continues. However, production for the December 2014 and March 2015 quarters are noticeably lower than the September 2014.

READY MIXED CONCRETE PRODUCTION

% CHANGE

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<th>REGIONS</th>
<th>March 2015 Quarter</th>
<th>March 2014 Quarter</th>
<th>% Change</th>
<th>Annual Total to Mar. 2015</th>
<th>Annual Total to Mar. 2014</th>
<th>% Change</th>
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</thead>
<tbody>
<tr>
<td>Auckland &amp; Northland</td>
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<td>284,430</td>
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<td>453,992</td>
<td>399,789</td>
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<td>15.02</td>
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<td>824,730</td>
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<td>3,769,504</td>
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METROPOLITAN AREAS

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<th>March 2014 Quarter</th>
<th>% Change</th>
<th>Annual Total to Mar. 2015</th>
<th>Annual Total to Mar. 2014</th>
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<td>159,981</td>
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<td>770,826</td>
<td>634,679</td>
<td>21.45</td>
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</table>

These statistics have been prepared with funding assistance provided by: Firth Industries Ltd and Golden Bay Cement Ltd
CEMENT STANDARD STRENGTHENED

Cement supply is a staple of New Zealand’s construction industry. In 2014, over one million tonnes was supplied to the construction and infrastructure sectors.

The structure of the cement industry has changed considerably with cement imports increasingly commonplace. This shift will continue as Holcim (NZ) Ltd move to an import model in 2016.

New Zealand’s cement Standard, NZS 3122 Specification for Portland and Blended Cements (General and Special Purpose), has recently been subject to amendment, with the updated version published in December 2014. Whilst NZS 3122 has served the industry well, the amendments further strengthen the requirements for this important construction material.

The Standards committee, consisting of representatives from the cement and concrete industry together with representatives from IPENZ and the University of Canterbury, incorporated into the latest edition requirements for sampling and testing, and a provision to restrict the total alkali content of the cement.

These new provisions, together with their rationale, are described below.

TOTAL ALKALI CONTENT

In NZS 3122 Table 1, the first amendment introduces a total alkali content requirement expressed as sodium (Na₂O) equivalent for type GP (General Purpose) and HE (High Early strength) cement.

Aggregates susceptible to the potentially deleterious effects of Alkali Silica Reaction (ASR) exist in certain parts of New Zealand. Whilst provisions for minimising the risk of ASR are given in the CCANZ publication TR3 Alkali Silica Reaction: Minimising the Risk of Damage to Concrete: Guidance Notes and Recommended Practice, one such provision is to limit the maximum total concrete alkali content when potentially reactive aggregates are employed. The amendment to NZS 3122 limits the alkali content to 0.6% or less which will assist in achieving the limit on concrete alkali content. Importantly however, it does not replace the need to include the alkali from other sources such as admixtures, and it is imperative that the recommended procedures in the aforementioned TR3 are still followed (as indeed they need to be when General Blended, Low Heat and Shrinkage Limited cement types are used).

Interestingly, where there is specific prior agreement and notification of the purchaser or cement user; the cement manufacturer or supplier may supply cement which exceeds this maximum alkali limit. Whilst this may seem counter-intuitive, it should be remembered that where aggregates which are deemed to be non-reactive are used, no precautions are necessary in terms of ASR. Non-reactive aggregates are commonplace in New Zealand.

Under the new amendment, the supplier must report the alkali content to two decimal places, and the highest single value that is acceptable is 0.64%.

SAMPLING AND TESTING

Sampling and testing frequencies are now introduced in NZS 3122 Appendix E. There were no provisions in the previous version, although it should be stressed that the two cement companies, Golden Bay Cement and Holcim (NZ) Ltd, which have historically supplied the lion’s share of New Zealand cement, have always tested and reported routinely.

Furthermore, it is a new requirement that all cement sampling shall be undertaken at the point of entry into New Zealand prior to distribution to the New Zealand market. This ensures complete traceability between the cement consignment and its certification. It is also a requirement that any cement supplied out of sample date shall be subject to re-sample and re-test by the supplier. Again this tightens up the previous requirements.

Appendix E also gives minimum sampling and testing frequencies for ‘proven’ and ‘unproven’ sources. A source is proven where there is at least six months of data obtained in accordance with NZS 3122. All testing has to be undertaken by a laboratory independently accredited by a member of the International Laboratory Accreditation Cooperation, such as NATA or IANZ. Unsurprisingly, sampling and testing frequencies are significantly more onerous for unproven sources.

As in previous versions of NZS 3122, cement properties are classified as ‘specified’ or ‘reportable’. Of the eight reportable properties, the supplier will report test results as nominated by the purchaser or user. The supplier does not have to report the reportable properties unless requested.

At a time of dynamic change in New Zealand’s cement industry it is pleasing to see that the cement Standard has kept pace to help maintain confidence in this vital construction material.
CONCRETE QUALITY CONTROL IN NEW ZEALAND

The following provides information in relation to the recent issue of low strength concrete production at a Firth Industries plant in Auckland. The quality control mechanisms for concrete in New Zealand are also covered, with a particular emphasis placed on the NZRMCA’s Plant Audit Scheme.

BACKGROUND

You may be aware of recent media reports that an Auckland ready mixed concrete plant supplied low strength concrete to a number of customers/projects.

The quality control testing programme at the plant in question found that some concrete had not met product specifications.

Investigations identified that mechanical failure of measuring equipment at the plant was the cause of the issue, which was therefore isolated to that one site. The faulty equipment has been replaced and calibrated, and the plant reopened.

The 70 affected customers range in size from individuals having a garden path installed to the Waterview project. Tests showed that in half of the affected sites no remedial action is required and the concrete can safely remain in place. Work is continuing with customers on the remaining construction sites to provide appropriate remedial action as quickly and effectively as possible.

More information can be found on the Firth Industries website www.firth.co.nz.

The identification of the issue and its remediation is testament to the quality control testing programme at the plant, which is assessed under the NZRMCA’s Plant Audit Scheme.

The plant in question has now undergone a new audit to reaffirm its certification after remedial actions. The incident, remedial actions and audit have been reported to the Ministry of Business Innovation and Employment (MBIE) by the Scheme’s Chairman in accordance with protocols agreed between the NZRMCA Council and MBIE.

CONCRETE QUALITY CONTROL

1. New Zealand currently produces around 3,700,000m³ of concrete annually. The reliable supply of quality controlled concrete is vital to the country’s construction industry.

2. The Plant Audit Scheme operates to audit NZRMCA member’s ready mixed concrete plants as defined in New Zealand Standard NZS 3104 Specification for Concrete Production.

3. In order to demonstrate compliance to NZS 3104 ready mixed concrete suppliers operating within the Scheme adhere to exacting quality control procedures as part of their quality assurance system. These procedures include:

   • Monitoring mean concrete strengths and coefficients of variation
   • Maintaining aggregate quality by testing and monitoring
   • Maintaining weigh scale calibration and accuracy at the required frequency
   • Undertaking mixer efficiency tests
   • Maintaining laboratory equipment calibration
   • Maintaining production and testing records
   • Reviewing the training needs of key staff
   • Assessing plant operator performance

4. The ready mixed concrete supplier’s performance is audited by the Scheme. Failure to maintain testing requirements can result in the withdrawal of an Audit Certificate from the ready mixed concrete supplier:

   a) Certificates of Audit are issued by the Scheme for a period not exceeding 12 months. The current status of plants is updated on the Scheme’s website – www.rmcplantaudit.org.nz

5. The Scheme is certified to ISO 9001 and undergoes external validation audit by BVQI (Bureau Veritas Quality International) on an annual basis.

6. The Scheme is administered by the Plant Audit Committee, which is comprised of five or more engineers with significant experience in the concrete production industry.

LEARNING OPPORTUNITIES

The recent issue at the Firth Industries plant in Auckland will be assessed by the NZRMCA for learning opportunities around communication, training and possible adjustments to the Scheme. NZRMCA Members will be kept fully informed of any developments and recommendations etc.
Virgin Concrete Ltd, situated in Kamo just north of Whangarei, has been supplying ready mixed concrete to the local market as an NZRMCA member since 2009 – almost seven years.

In this relatively short period of time the family owned business, established by Dick Fisher and managed by his daughter Suzy Fisher, has created a history built on determination and a commitment to excellence, and also involving the odd famous name or two.

THE EARLY YEARS
Dick Fisher started his working life serving a five year watch making apprenticeship in the family jewellery business now known as Fishers on Cameron - a Whangarei institution for over 80 years.

Dick’s cousin (Sir) Michael Hill, who went on to achieve national and international business success, not to mention a knighthood, was also employed by the business in a sales role.

At some stage however, Dick must have decided the jewellery game wasn’t for him, and founded Avon Industries Ltd in Kamo, a sizeable heavy engineering company that operates a state-of-the-art galvanising plant.

This business is now owned by Dick’s son, (Suzy’s brother) Richard, who is currently busy rebuilding a CON-E-CO batch plant, recently purchased from Counties Ready Mix, next to Virgin Concrete’s existing plant.

CONCRETE BEGINNINGS
Exact details are a little hazy, but the family were advised that the chunk of land they owned adjacent to Avon Industries Ltd in Kamo, a sizeable heavy engineering company that operates a state-of-the-art galvanising plant.

This business is now owned by Dick’s son, (Suzy’s brother) Richard, who is currently busy rebuilding a CON-E-CO batch plant, recently purchased from Counties Ready Mix, next to Virgin Concrete’s existing plant.

VIRGIN VS. VIRGIN
The origin of the name Virgin Concrete is also testament to Dick’s tenacity and refusal to back down easily.

Dick came up with the name Virgin Concrete for obvious reasons; it was a new venture in which the family had no previous experience.

He went off to register the company, and low and behold a person by the name of Sir Richard Branson had registered the term “virgin” in over 3,500 business categories worldwide, therefore making it unavailable to a fledgling ready mixed concrete company in New Zealand.

What followed was a protracted Dick vs. Goliath battle, in which it seemed impossible for the local hero to prevail.

High level legal discussions were held on the other side of the world, but despite the threat of huge legal fees and only the slim possibility of victory, Dick remained determined to succeed.

As it transpired, an interesting chain of events and coincidences played out which saw the underdog win the day, and be permitted to use the name Virgin Concrete.

Aside from a lack of experience the name represents many meanings in the battle between a principled local businessman and global corporate giant.

BUILDING A SOLID BUSINESS
Virgin Concrete has grown steadily since its unique beginnings, and is now well established and respected within the Whangarei and Northland concrete market.

Currently operating 13 Isuzu trucks, the family’s other main business interest are clearly evident in the trucks’ many galvanized external parts.

The company gained its NZRMCA Plant Audit Certificate soon after operations began, and this forms the basis for setting a high standard of concrete quality and customer service.

Beacon Technical Services has been involved as plant engineer and technical adviser throughout.

CLOSE FRIENDS AND MENTORS
Virgin Concrete was very fortunate in the early days to have the experienced services of the now late Bob Bruce.
Bob had worked in the Northland concrete industry for a long time, representing several companies over a wide range of roles. Bob was also the NZRMCA Northland branch secretary/treasurer for over 30 years.

Living just around the corner from Kamo township, Bob undertook part time work with Virgin Concrete, mainly because concrete was in his blood and he just had to be involved.

Bob was the answer to Virgin Concrete’s prayers; as there are aspects of concrete production which can only be learnt by many years’ experience and Bob was able to impart this knowledge to the newcomers.

Unfortunately, Bob passed away in December 2010 aged 78 but he made a lasting impression at Virgin Concrete. Doing things right has been fundamental to the company’s success. Taking on board and listening to those with the ‘knowledge’ had them set on a good heading right from day one.

PROUD LOCAL PROJECTS

Many interesting projects across Northland have been undertaken with the assistance of Virgin Concrete since it has been in operation. Perhaps the most notable is New Zealand’s most expensive residential project near, located near Helena Bay between Whangarei and Russell, and owned by billionaire Russian steel magnate Alexander Abramov.

Many truck loads of concrete have been delivered to the multi-million dollar luxury resort development constructed by Northland Coastal Developments. In fact, such has been the scale and complexity of the project that Virgin Concrete has continued to supply for over five years.

ONGOING EXCELLENCE

Suzy manages the day to day running of the batching plant and it is usually her who customers will speak to when they call, be it early in the morning or late in the evening.

This hands-on approach is very important in keeping a finger on the pulse and making the decisions which are necessary throughout a normal day at a busy concrete plant.

Customer service is an important part of Virgin Concrete’s success. Communicating supply changes or production delays goes a long way to ensuring risks are minimised and relationships maintained.

Suzy is keen to point out that “It takes an awesome team for a business to run smoothly, and I have that team.”

While the company can by no means still be considered ‘virgins’, the name will not be changed, and continues to represent the family and company’s values and attitude towards the people it deals with and the local community it serves.
ANOTHER MAJOR MILESTONE FOR HOLCIM

The next stage of Holcim New Zealand’s state-of-the-art cement storage dome at PrimePort in Timaru is now up, which is a major milestone in the $50 million project.

Holcim is investing $100 million in building 30,000 tonne new storage facilities in Timaru and Auckland as part of its business strategy of global sourcing for supply into the New Zealand market. Along with the global sourcing, Holcim NZ has comprehensive supply chain management expertise that is critical to the construction and infrastructure sectors.

The construction phase in Timaru will employ 50 people while the facility will employ eight staff once fully operational in the first half of next year.

New Zealand Country Manager Glenda Harvey says the terminal in
Timaru provides effective access to the major market of Christchurch, utilising the new $5million silo capacity completed in January 2014 at the Lyttelton Port of Christchurch.

“This terminal also provides effective distribution to the whole of the South Island market and the lower North Island as well.”

Glenda Harvey says the dome is a first for New Zealand and demonstrates the company’s drive to tap into the best of innovation used by Holcim around the world.

Construction inside the dome is advancing well and has involved applying an insulation layer of polyurethane foam to provide initial rigidity and a thermal barrier from the outside elements, then layers built up using reinforcing and concrete (sprayed shotcrete). The innovation and technology being used is world class and is another example of the benefits Holcim New Zealand gains from the global Holcim family of companies.

“The company globally invests millions in research and development and sourcing high quality product along with managing transportation and logistics for customers. This reduces risk to customers as Holcim can tap into a wide network to source cement and most importantly make sure it gets to where it needs to when it is needed.”

“This is critically important to the construction and infrastructure sectors particularly with the huge demand post-earthquake in Christchurch.”

Glenda Harvey says as a global leader, Holcim applies stringent quality criteria to its sourcing strategy to ensure that markets receive the best possible product to meet local performance criteria.
BCITO IN 2015

2014 was a big year for BCITO as we continued to come out of the effects of the recession and strong growth in apprentice numbers has continued. We signed more than 5000 new apprentices into training and ended the year with around 9500 active trainees. Our biggest challenge in 2014 was managing growth while determinedly maintaining quality and service.

Some of this growth has been as a result of having started the year by merging with the Joinery ITO along with DecorateNZ and FloorNZ. The merger brought together great trades and great people. An important part of the next stage was to conduct a comprehensive review of the specialist trades in the joint coverage.

This review took most of the year and consulting with industry and BCITO staff, we looked at each trade. We then considered whether in this new environment, we could enhance service delivery and educational outcomes.

We’ve introduced some enhancements at the beginning of 2015.

The first enhancement you will notice is a refreshing of our BCITO brand. This is not intended to be a major change but rather to simplify and modernise the look and feel of the brand to make it more friendly and accessible. In particular, we want to emphasise that BCITO is about people and enabling their success. The new branding is now gradually being rolled out.

The changes are more than just about branding. The Specialist Trades Group, which we put in place at the time of the merger, has been disestablished, and two major changes have occurred.

Firstly, the specialist trades field staff have doubled in number and merged into the broader BCITO area teams. Secondly, we have brought together all functions that engage directly with industry into a new Stakeholder Engagement Group including all research, marketing and communications functions.

Importantly this group includes a new team of Industry Advocates, who will be active in the particular trades assigned to them. The next issue of the NZRMCA Newsletter will profile Angela Lewes, Industry Advocate for all the concrete sectors.

Angela will be liaising with and consulting industry leaders, and stakeholder groups to promote efficient and effective consultation and communication.

2014 was a great year for BCITO thanks to the strong support we have received from industry, matched by the commitment of the BCITO Team.
LAYING THE FOUNDATIONS FOR SUCCESS WITH BCITO

With unprecedented levels of building and construction activity generating an abundance of new opportunities for businesses around New Zealand, it’s important for businesses to ensure they keep up with demand.

With over 20 years’ experience working in the building and construction industry, Quentin Stevenson, Director of concrete slab and foundations company, Slab Specialists, is a firm believer in the importance of training in order to keep up with demand as well as keeping on top of the game.

Employing 60 staff, Slab Specialists has offices in Auckland and Christchurch, two of the fastest growing cities currently seeing a boom in building and construction.

Looking to expand the business and cater for the ever-increasing demand for specialist foundations, Quentin currently has 15 staff enrolled in managed apprenticeships with BCITO, the largest provider of trade apprenticeships in New Zealand.

Quentin has created a proven system of learning, combining onsite hands-on development with classroom sessions to give his staff the extra edge. “Every Monday night we pull all our apprentices into the office for a training session, over and above their work day,” says Quentin. “It’s very easy to use an apprentice as a labourer, but we try to train well and get into our guys’ heads that they are training to be professionals so that’s the kind of attitude they have to have. Pizza turns up at 6 o’clock so they know if they want a free feed as well they’ve got to be here every Monday night at 6 on time.”

After the usual 3-month trial period, workers get the opportunity to undertake an apprenticeship with BCITO. The combination of Quentin’s rigorous training programme with visits and assessments made onsite by a BCITO Training Advisor has created a loyal and highly skilled team within Slab Specialists. “They’re getting paid while being trained on the job doing a BCITO programme. At the end of it they come out with a recognised qualification which means they can earn some decent money. Our apprentices have a dedicated person on staff who helps them get through their BCITO work over and above the support they get from BCITO,” says Quentin. “This helps create a good environment of professionalism and it helps them to know that they’re actually achieving something.”

Not only has taking on apprentices satisfied Quentin’s labour requirements, it also has had wider ranging benefits for the company and Quentin’s own personal development. “It makes you think yourself because you’re having to train them (the apprentices) so it keeps you on your toes and on top of the latest developments. Some of our more senior guys have huge amounts of experience but they were trained before computers.”

“What I say to our guys is if you work 9-5 and do no extra training after hours you’ll stagnate – you just won’t go anywhere. The people who make the All Blacks, they aren’t just talented; they work hard to get there and then work even harder to stay there,” says Quentin.

“Business is no different, if you’re a professional person you get paid for your labour so the All Blacks just decided to get paid for playing rugby but they put a lot of effort into always training, keeping their game sharp and as a professional builder, you need to do the same.”

If you’re an employer needing to add to your team to meet demand – contact BCITO today on 0800 422 486, they may even be able to find your new apprentice for you through their job matching service.
HEAVYWEIGHT CONCRETE: TÅBY CITY HALL, SWEDEN

By Dave Parker

Super dense concrete has solved a tricky basement challenge in Sweden.

Designers of deep basements extending below the local water table must always consider hydrostatic, in particular the vertical forces generated by the basements’ inherent buoyancy. These can generate enough uplift to threaten the overall stability of the building above. If enough of the deadweight of the building is carried by the basement structure, this risk can be nullified — but that was not the case at the new seven storey city hall in Täby, Sweden.

Heavily fissured granite had to be blasted and sawn to create space for a two storey basement car park measuring 53m by 36m in plan. The lower storey is entirely below normal groundwater level. Uplift, however, is not cancelled out by the building’s deadweight, as main contractor Sweco engineering project manager Peter Hniopek explains.

“The office above has a wider span than the car park levels, which means there isn’t enough deadweight on two column lines on the lower floor.”

“Without special measures, at high groundwater levels, the foundation pad would lift along these two lines.”

Originally Sweco had proposed to solve the problem with rock anchors, but the need to drill wells for ground-source cooling below the basement would have complicated installation and probably added significant extra costs.

Luckily, a member of the Sweco project team had previous experience of heavyweight concrete. The alternative of adding high density ballast to the basement looked increasingly attractive the more it was evaluated.

“We realised that heavy concrete would give us the extra deadweight needed without excessive volume,” says Hniopek. “Furthermore, it would be much quicker than rock anchoring, meaning we could meet our agreed delivery time.”

The laws of physics also endow high density concretes with another crucial advantage in what is effectively an underwater environment. Archimedes’ Principle states that a body immersed in water will be subject to an uplift equal in weight to the volume of water displaced.

Thus a cubic metre of concrete will lose around 1t of deadweight when immersed.

Sweco was aiming for a density of 3,700kg/m³, which in effect meant that the high density concrete would have an effective deadweight of 2,700kg/m³ when immersed, more than twice that of normal concrete in a similar situation.

This was based on the choice of magnetite (iron ore) as aggregate. LKAB Minerals could supply magnetite in zero to 2mm, zero to 8mm and 2mm to 20mm fractions from its mine at Kiruna in Sweden, understood to be the largest underground iron mine in the world. A density of 3,700kg/m³ was easily achievable and compressive strengths equivalent to normal mixes would have been no problem.

However, on the Täby city hall project, compressive strength was not an issue and was not specified. The normal concrete basement slab was designed to take all loading.

Basement subcontractor Skanska production manager Daniel Kedland says that constructing the basement is “like casting a large boat.” He adds: “We calculated that by casting two ‘loaves’ under the base slab we could create the deadweight we needed.”

These “loaves” measure 3m wide by 550mm deep, and extend across the 53m length of the basement. The concrete arrived ready mixed and could be placed with the truckmixers’ chutes. Kedland admits he had some concerns before placing began.

“I had never worked with heavy concrete before. I was worried that it would be very stiff and difficult to compact. But it was like normal concrete, and there were no real problems.”

Overall the verdict on the super dense concrete was very positive. It was much easier to work with than some feared, and was quicker and simpler than the rock anchoring alternative. Not to mention being significantly cheaper as well.
HEAVYWEIGHT CONCRETE’S HISTORY

Heavyweight concretes first appeared on the large scale in the 1950s and 1960s, paralleling the growth of the nuclear power industries in the UK and United States.

Their much greater density made them a realistic option for radiation shielding, reducing the thickness and volume of concrete needed to contain deadly ionizing gamma rays.

Later the booming offshore oil industry also took advantage of the higher densities to ballast pipelines and seabed installations. Most major hospitals now have radiotherapy treatment centres, where heavyweight concrete is usually the radiation shielding solution. It has also found uses in counterweights on cranes.

Ultimately, concrete density is determined by aggregate density. Options include barites or barytes (barium sulphate), the iron ore magnetite, iron shot, or even lead shot. Barites concretes have a density of around 3,500 kg/m³, 45% greater than normal concrete, and are non-magnetic. With magnetite a density of 4,000 kg/m³ is possible, more than 60% higher than normal.

Should even higher densities be required, iron shot concretes can offer 5,900 kg/m³, while lead shot aggregate can yield a density of 8,900 kg/m³. Such concretes are very expensive and difficult to handle.

All heavyweight concretes suffer from similar drawbacks. Truckmixers and skips can only carry a significantly smaller volume than normal, and formwork pressures will be higher.

Heavyweight concretes can be successfully pumped, but wear and tear on pumps and mixers will be greater. More energy is usually also needed to achieve full compaction unless plasticising admixtures are used, so poker vibrators have to be inserted at closer centres.

Compressive strengths equivalent to normal density concretes are readily achievable.

A typical C25/30 mix with a wet density of 3,900 kg/m³ using magnetite aggregates would have a cement content of 290 kg/m³ and a water/cement ratio of 0.55. A plasticiser would be included.

Swedish magnetite aggregates in a range of sizes are available in the UK from LKAB Minerals. Barites (barytes) aggregates are produced from mines in Scotland and to a lesser extent in England, although the primary use of UK barytes is to increase the density of drilling fluids for oil and gas exploration. Barytes production and hence the availability of barytes aggregates for concrete is influenced directly by the fortunes of the oil and gas industries.

Durability of magnetite and barytes concretes is similar to that of mixes using other types of natural aggregates. Durability and compressive strength can be enhanced by the inclusion of condensed silica fume (microsilica) and modern high range water reducing admixtures (superplasticisers).
KEY DATES

NZRMCA REGIONAL MEETINGS (check local notices for confirmed dates and precise times)

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<td>Tuesday, 21 July 2015</td>
<td>Christchurch</td>
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<tr>
<td>Lower North Island</td>
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<td>Wellington</td>
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<tr>
<td>Auckland / Northland - Combined</td>
<td>Friday, 21 August 2015</td>
<td>Snells Beach</td>
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NZRMCA NATIONAL COUNCIL MEETINGS

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<tbody>
<tr>
<td>Council</td>
<td>Wednesday, 12 August 2015</td>
<td>9.30 a.m. to 3.00 p.m.</td>
<td>Wellington</td>
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<tr>
<td>AGM</td>
<td>Thursday, 09 October 2015</td>
<td>3.30 p.m. to 5.00 p.m.</td>
<td>Rotorua</td>
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<tr>
<td>Council</td>
<td>Wednesday, 11 November 2015</td>
<td>9.30 a.m. to 3.00 p.m.</td>
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FUN (CONCRETE) FACT

‘LIVING CONCRETE’ THAT CAN HEAL ITSELF

Buildings and structures made of concrete that can “magically” seal and fully repair cracks caused by tension? What may have seemed a utopian scenario just a few years ago will soon become reality, thanks to the invention of microbiologist Hendrik Marius Jonkers.

His vision: to develop a bionic approach that improves the tensile strength and eco-friendly properties of concrete. The Dutch researcher set out to develop the bio-concrete of the future - with limestone-producing bacteria that can survive in a concrete structure for up to 200 years, and which “awaken” when damage occurs, enabling them to heal the cracks.

In Europe, where concrete makes up 70 per cent of infrastructure, Jonkers’ ground-breaking innovation promises to reduce the costs of concrete production and maintenance, as well as curb resultant carbon dioxide emissions.

To heal cracks in the concrete, Jonkers chose bacteria (Bacillus pseudofirmus and B. cohnii), that are able to produce limestone on a biological basis. The positive side-effect of this property: the bacteria consume oxygen, which in turn prevents the internal corrosion of reinforced concrete. However, the bacteria do not pose a risk to human health, since they can only survive under the alkaline conditions inside the concrete.

Based on these findings, Jonkers and his team of researchers developed three different bacterial concrete mixtures: self-healing concrete, repair mortar, and a liquid repair system. In self-healing concrete, bacterial content is integrated during construction, while the repair mortar and liquid system only come into play when acute damage has occurred on concrete elements.

Self-healing concrete is the most complex of the three variants. Bacterial spores are encapsulated within two-to four-millimetre wide clay pellets and added to the cement mix with separate nitrogen, phosphorous and a nutrient agent. This innovative approach ensures that bacteria can remain dormant in the concrete for up to 200 years. Contact with nutrients occurs only if water penetrates into a crack— and not while mixing concrete. This variant is well-suited for structures that are exposed to weathering, as well as points that are difficult to access for repair workers.


Source: European Patent Office.