July 2025

CANZAC® IGROUP LTD
Improving the performance of concrete worldwide®

CONCRETE COMPASS

Welcome to the latest news from the World of Concrete

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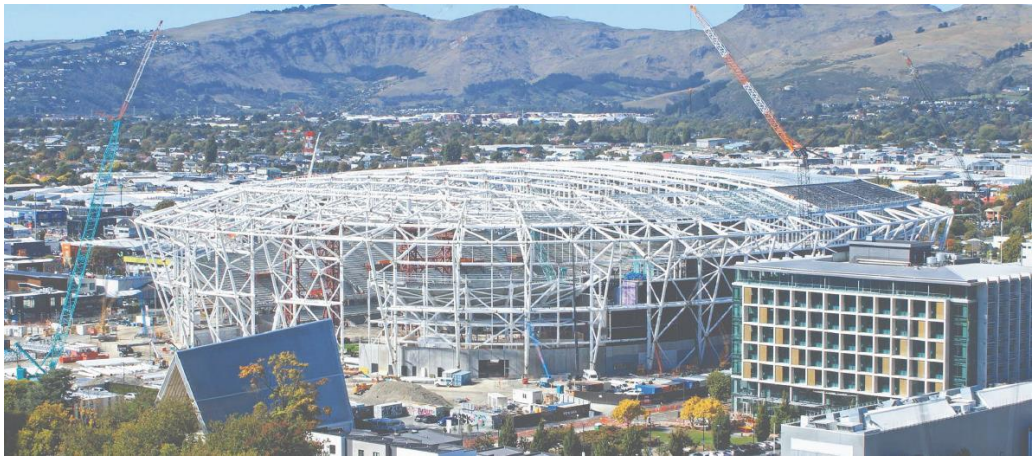


STADIUM ONE PROJECT UPDATE

It's not very often that you get to be involved with the construction of a new sports and entertainment stadium.

The last one we got to work on was the Christchurch temporary stadium, that was constructed after the Christchurch earthquakes in 2012. Built in just 11 weeks, it had a seating capacity of 18,000 and cost $32 million to build.

Before that we were involved with the Dunedin Stadium, in May 2009, which was completed in August 2011. It had a seating capacity of 30,000 and cost $250 million to build.

It's worth noting the Dunedin Stadium was the second stadium in the world to have a natural grass playing surface inside a fully enclosed stadium, and Christchurch would follow.

That brings us to Stadium ONE, the new Christchurch sports and entertainment stadium currently under construction.

Although the Dunedin Stadium was completely different from a design point of view there was a lot of concrete that was poured into the substructure foundations.

We pioneered the use of our **Speedform®** product on the Dunedin Stadium project. The same system was used on the new Christchurch Stadium project. In fact, over 12,000 square metres of the product was used - **see the distinctive red formwork in some of the photos.**

The use of **Speedform®** helped speed the substructure foundations to keep the project on programme.

We also supplied over 7,000 anchors that were used to lift the bleachers and main staircase into place. The bleachers are used to fix the seating to. There were 11 kilometres of bleachers that were manufactured offsite for the project.

SOME STADIUM FACTS

- Cost $683 Million
- Seating Capacity of 25,000 Permanent and 5,000 Temporary 37,000 Concert Capacity
- 32,770 Cubic Metres of Concrete
- 16,300 Tonnes of Steel
- Construction time 4 years - April 2022 - April 2026



CANZAC® was also awarded the supply contract to seal/coat all the stadium bleachers with our product **Convergent Pentra-Sil NL**® that hardens and densifies the precast units.

The same products will be used on the Concourse as well as another product on top called **Pentra Guard**®. This will be applied to the surface of the concrete and will provide some stain blocking protection, making the clean up of spills a lot easier.

All up Convergent Pentra technology would be applied to over 40,000m2.

It was also good to see the main contractor Besix Watpac use local subcontractors and suppliers. So, we thought we would give them a mention.

Some of the subcontractors involved in the concrete trades were:

- Southbase Construction
- Guyton Reinforcing
- Lanyon and Le Compte
- BG Cooke
- Kstruct
- Procrete
- McKendry Construction
- Francis Ward
- Top Coat
- Allied Concrete

CANUTE ON CONCRETE

Concrete floor slabs & pavements

"TO ARMOUR OR NOT TO ARMOUR"

A LITTLE HISTORY ON FLOOR JOINTS

The very first floor joints were designed in 1998 to solve problems associated with previous concrete slab design methods.

Earlier design methods for conventional slab construction resulted in floors with many joints, with a mix of construction joints and sawcut joints, which gave little control over which joints the shrinkage movement appeared in or the width of joints.

Lesa Systems Armour Joint® was the first product of its type in the world and enabled the introduction of improved design and detailing methods which control widths of floor joints in conventional steel fibre and post-tensioned floors.

The shrinkage movement of the concrete is focused into fewer joints, at a wider joint spacing.

These joints can be protected against damage, and dowels are incorporated to suit the joint width and loading.

ASK ANY INDUSTRIAL BUILDING OWNER OR OCCUPIER

What is their biggest problem with their concrete floor? I will bet you the answer is the joints. In these facilities joints start to deteriorate 12 to 18 months after initial occupation. If these joints had been armoured in the first-place, joint deterioration would not happen.

When we consider the cost of the concrete slab in these facilities it is about 15% of the total build cost and we know that all the productivity happens on the floor slab.

WHY DON'T WE ARMOUR ALL FLOOR JOINTS?

The main reasons are - they are not designed into the slab by the designer, they are not required by the client, or they are tagged out at tender stage because they are deemed or seemed to be expensive.

But, in reality, the repair costs and the downtime to deal with the problem 12-18 months later can be considerable and can amount to 2-3 times the cost of designing and installing the armour joints in the first place.

WHAT IS AN ARMOUR JOINT?

Lesa Systems Armour Joint® is a complex permanent formwork system for creating and protecting movement joints in concrete slabs on ground.

It incorporates anchored steel armouring at the concrete edges and includes dowels for load transfer across the joint.

WHERE ARE ARMOUR JOINTS USED?

Lesa Systems Armour Joint® is used in concrete slabs on ground and suspended slabs.

THREE PRIMARY FUNCTIONS

There are three primary functions in most versions of **Lesa Systems Armour Joint®**:

1. The full depth divider steel sheet creates the joint and defines where movement will appear.
2. Steel armouring protects the concrete edges from spalling damage.
3. Built in dowels that transfer live loads across the joint.

FLOOR DESIGN METHODS

There are three primary design approaches for concrete slabs on ground.

1. Conventional construction, both reinforced and un-reinforced.
2. Steel Fibre reinforced, both low dosage and high dosage (also known as joint free).
3. Post Tensioned.

Each of these approaches has advantages and disadvantages, and **Lesa Systems Armour Joint®** is suitable for and is widely used in all three.

A summary is as follows:

Concrete slabs on ground differ from most structural concrete components, as the concrete is used in tensions.

Concrete tensile stresses must be kept low enough to avoid cracking. Cracking in floor slabs (except under saw cuts) is undesirable, and unnecessary with proper design and detailing. One of the major functions of joints in the floor slabs is to limit the level of concrete tensile stress which occurs.

CONVENTIONALLY CONSTRUCTED FLOORS

These floors are the most common, being the traditional method of construction. The slabs usually include either bar or mesh reinforcing through them. It can be argued that the reinforcing is usually unnecessary.

Joints are created in both longitudinally and transversely directions at quite close centres, typically at about 6 metres. At this spacing, cracks are unlikely to occur between the joints. Both construction joints and sawcut joints are used to suit pour layouts.

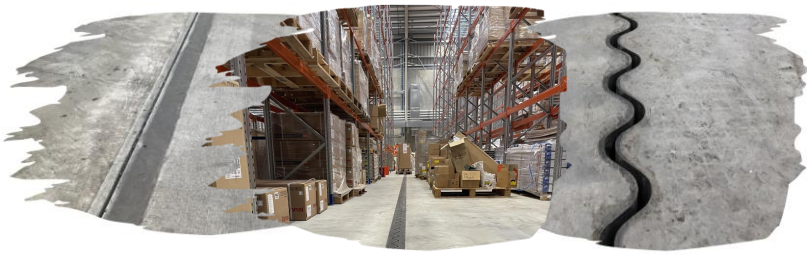
Joint widths and shrinkable movement can be controlled with proper detailing of the slabs and the use of defined movement joints. Traditionally this was not the case.

The use of **Armour Joint®** typically at about 25 metre centres in each direction focuses all shrinkage movement into the relatively small number of joints which are armoured to prevent spalling damage.

Joint widths usually do not exceed about 15mm, and **Lesa Systems Armour Joint®** Types A, B and K are suitable for the movement joints.

Dowels are often eliminated in sawcut joints, by using full reinforcing to hold these joints closed. This reduces the cost. High quality and economical floors can be constructed with this simple formula.

WHAT YOU WANT IS THIS:



NOT THIS!

STEEL FIBRE REINFORCED FLOORS

Steel fibre reinforced slabs fall into two distinct categories:

a. Low dosage slabs
   - In low dosage steel fibre slabs, a low level of steel fibre 15 - 20kgs/cubic metre of reinforcing is substituted for conventional reinforcing. The joint types and spacings are similar to conventional slabs. Dowels are advisable in sawcut joints.

b. High dosage (jointless or joint free) slabs
   - High dosage steel fibre slabs have different performance characteristics, and the reinforcing steel fibre dose at 30 - 40kgs/cubic metres is used to increase structural strength.

Movement joints are often located at 25-30 metre centres or greater, without saw-cuts between the movement joints. This results in very high-quality, well performing slabs.

Joint widths are typically no more than 20 mm and rarely exceed 25 mm. At these joint widths, an armour joint which includes a cover plate is advisable.

Lesa Systems Armour Joint® Type L45 is the most commonly used product for high dosage steel fibre reinforced floors.

POST-TENSIONED PRE-STRESSED FLOORS

Pre-stressed floors use stressing cables to place the concrete under precompression, prior to live or static loads being applied.

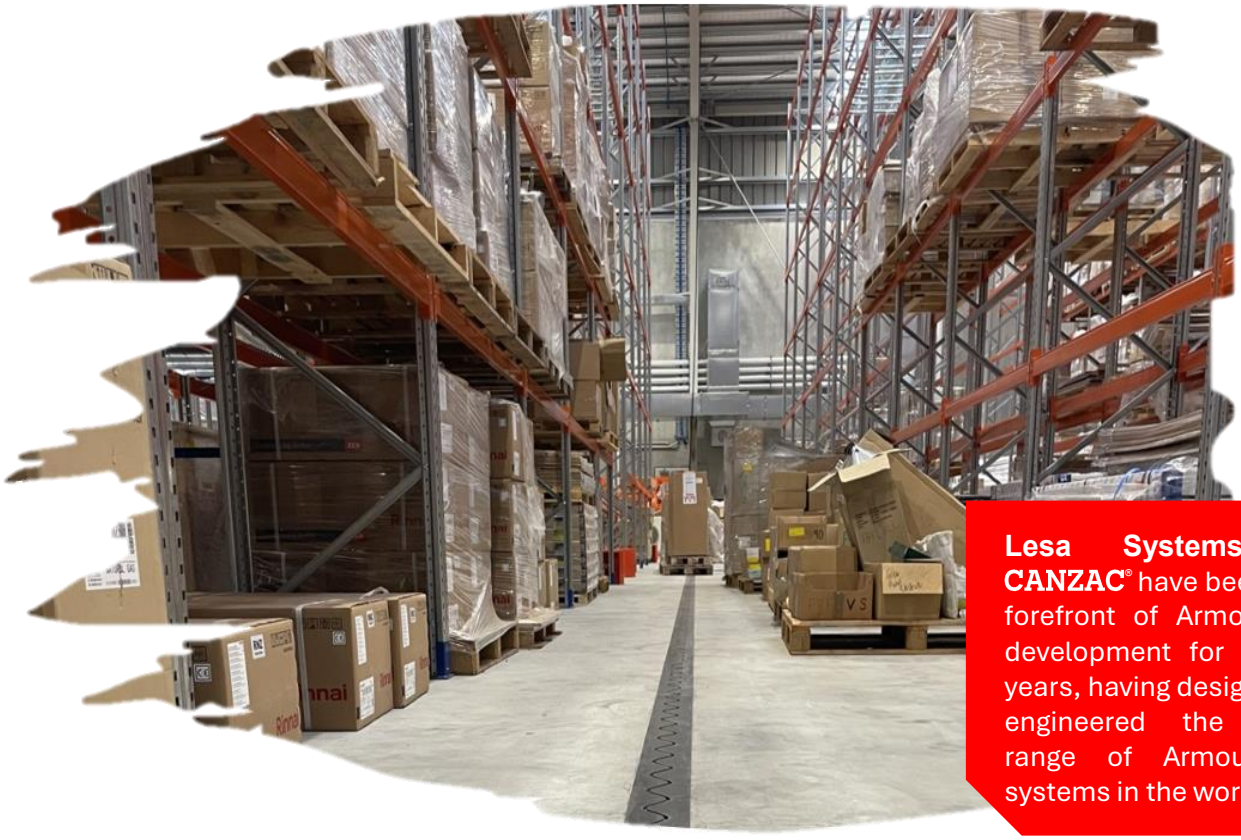
This increases the "available" tension on the concrete, allowing thinner slabs and wider joint spacing.

Construction joints, which also become movement joints, are frequently spaced 40 metres or more apart, but there are no saw cuts between these joints.

Total contraction movement in prestressed floors can be significant. In addition to full concrete shrinkage, strain shortening will occur over time. Joint widths of 30 mm are common, and in extreme cases can reach about 80 mm. **Lesa Systems Armour Joint®** Types G45, G65, G85, L45 and L65 are commonly used in prestressed concrete floors.

JOINT SPACING, LAYOUTS AND DETAILS

The correct layout of joints is essential in designing successful concrete slabs. We offer a design service for this.



Lesa Systems and CANZAC® have been at the forefront of Armour Joint development for over 25 years, having designed and engineered the largest range of Armour Joint systems in the world.

Dualcast®

Simply Superior – Engineered for Speed, Precision and Performance

Introducing **Dualcast®** - the game-changing UPVC Concrete Screed Rail System that allows you to form Durable Construction Joints faster and easier than ever before.

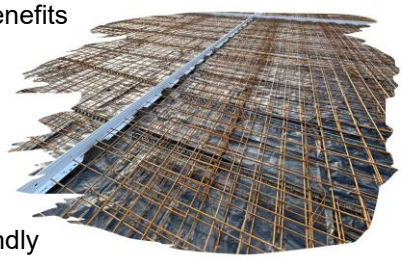
Dualcast® provides you with confidence that the formwork can be set as close as possible to the specified slab thickness (no big gaps underneath the bottom of the joint, that can affect structural integrity, and that can also lead to differential settlement at the joint face.)

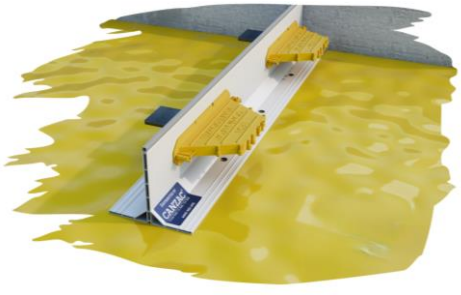
Covering all common slab thicknesses from 85 mm to 225 mm **Dualcast®** eliminates the need to support the joint on concrete dabs.

Our system ensures you achieve a durable, full-depth construction joint every time.

Dualcast® is packed with benefits

- Full-depth construction joints every time
- Speed of installation
- No removal required
- Versatile and reliable
- Sustainable and Eco-friendly





CANZAC® Under Slab - In Slab - On Slab | LESA SYSTEMS | MONSTA-SLAB | converge | ROMBUS INDUSTRIES | CANZAC® LTD Concrete Lifting Systems®