TWINTEC
Global Performance

www.twintecgroup.com

Steel fibre concrete **specialists**

Cover photograph courtesy of
McLaren Construction/Daniel Shearing

The Company

TWINTEC PROVIDES A PERSONAL PRODUCT THROUGH A TOTAL OFFER CONCEPT WITH A HIGH LEVEL OF PERFORMANCE, ENVIRONMENTAL, SUSTAINABILITY AND AESTHETICS WORLDWIDE.

The Twintec name reflects the twin technologies of concrete and steel fibres. Design expertise and high grade materials are coupled with experience, skilled workers, continuously improved procedures and specially designed equipment.

- 'Jointless' flooring specialists
- Total responsibility package
- Value-engineered designs
- Innovative
- Skilled, experienced workers
- Enviromentally sensitive
- State-of-the-art equipment
- Committed to research & development

> *"Professional, skilled, experienced and motivated staff.*

Committed to Our Clients

From the earliest stages of the planning process. Design and budget costs - the in-house team ensures a personalised solution that's tailored to meet clients' specific requirements.

Committed to Safety

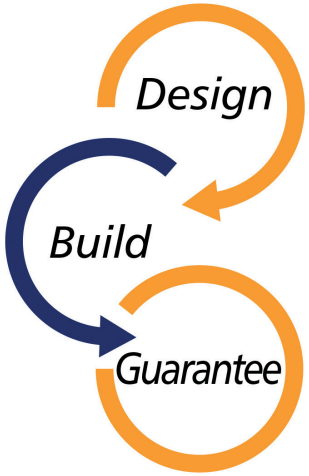
Twintec accepts nothing less than the best. The business has been built on a foundation of motivated and healthy employees and a safe working environment.

Committed to Sustainability

Twintec will minimise environmental impact by design optimisation and utilising the latest material technologies.

Total Offer Concept

THE UNIQUE **DESIGN. BUILD. GUARANTEE** PACKAGE DEMONSTRATES HOW **TWINTEC** TAKES TOTAL RESPONSIBILITY FOR THE STEEL FIBRE CONCRETE PRODUCTS.



> *Twintec products are all designed in-house by the specialist engineering team.*

Design

Value engineered design solutions adapted to each users' specific needs.

Twintec slabs are all designed in-house by the specialist engineering team. Incorporating the latest innovations in concrete floor slab design.

Build

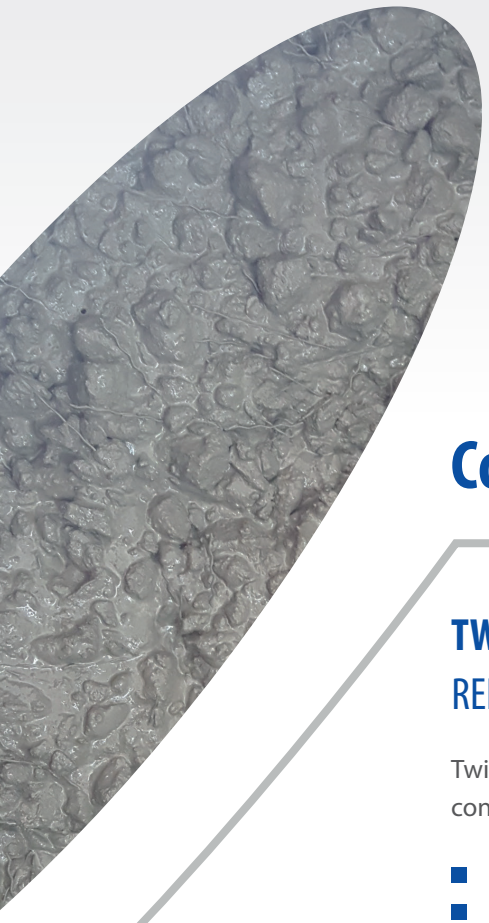
Site co-ordination, supply of materials, fast track construction and superior finishing worldwide.

Highly skilled and experienced staff. Innovative materials supported by rigorous testing, in-house developed and well maintained equipment.

Guarantee

The Twintec assurance guarantee.

Twintec's guarantee extends across the business incorporating quality control, professional staff, customer service and aftercare in addition to insurances.



Concrete & Steel Fibres

TWINTEC IS A TECHNICAL SPECIALIST IN THE USE OF STEEL FIBRE REINFORCED CONCRETE.

Twintec takes **total responsibility** for concrete mix design and delivery co-ordination, considering:

- Workability
- Compressive strength
- Shrinkage
- Rate and timing of bleed
- Setting time
- Concrete/aggregate grading curves
- Fibre mixing
- Quality of component materials

> *"Understanding components and on-site management of concrete is a key factor in the successful construction of 'jointless' floor slabs.*

In-house concrete specialists will assess the concrete supply for each project, carrying out trial mixes and plant trials to ensure appropriate and consistent mix design.

Twintec uses fibres extensively tested and proven to provide outstanding performance, control of cracks, maximum flexural and shear strength.

Fibres must be integrated on site by skilled/experienced operators using a high speed fibre integration machine to ensure homeogenous mixing.

'Jointless' Concept

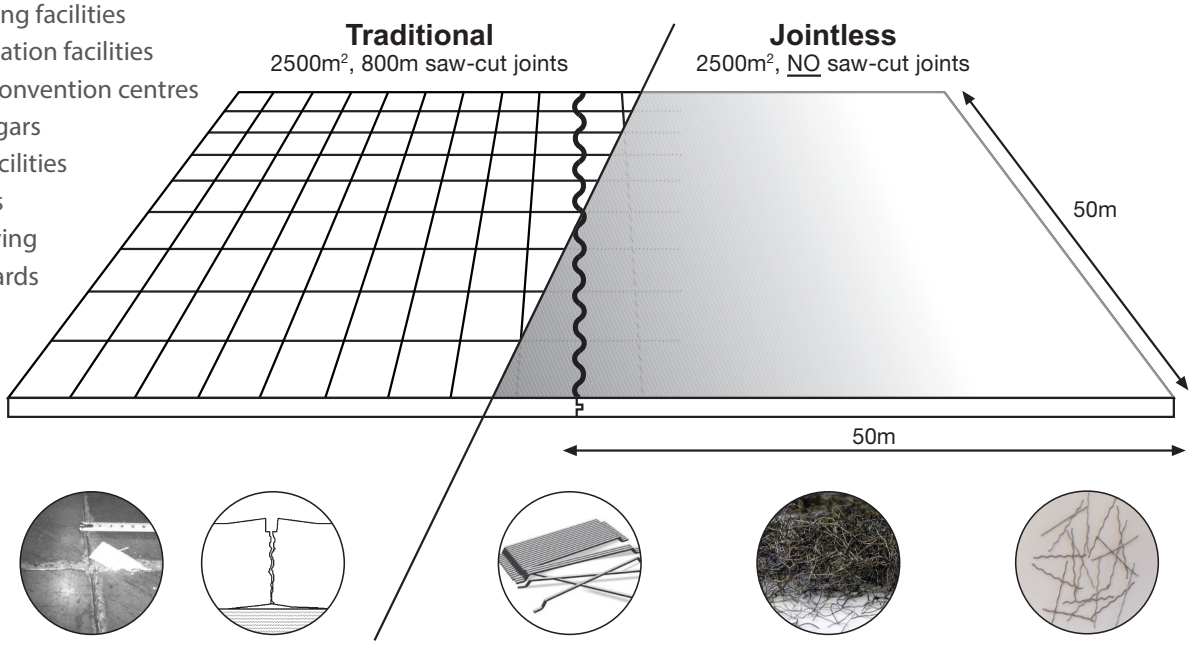
Twintec's 'jointless' floor slabs offer exceptional durability and performance. The floor is cast in large panels using steel fibre reinforced concrete. They do not require sawn-induced contraction joints, which are a major cause of floor problems.

Due to practical limitations on the area that can be constructed at any one time, Twintec uses steel armoured construction joints at the edges of each panel.

With proven expertise in design, concrete behaviour and SFRC technology, as well as strict monitoring and control over production, Twintec constructs panel sizes of up to 2500m^2, depending on concrete quality and availability.

Applications for 'jointless' floor slabs

- General warehouse/distribution centres
- VNA warehouses
- Cold store warehouses
- Manufacturing facilities
- Food preparation facilities
- Exhibition/convention centres
- Aircraft hangars
- Recycling facilities
- Data centres
- External paving
- Container yards



Production

Final regulating layer

Twintec carries out the final regulating layer using laser controlled equipment. This provides very accurate tolerances (+/- 5mm) and provides the platform for the floor slab casting process.

Day joint installation

Twintec uses steel armoured joints that have been selected for their heavy duty load transfer systems, durability and low maintenance costs. For the best effectiveness, these joints are located as far as possible in low traffic zones.

Steel fibre integration

Maximising productivity without compromising quality, Twintec's advanced steel fibre integration process is operated by experienced and trained staff using specially designed fibre integration machines. This process guarantees that the fibres will be uniformly dispersed into the concrete.

QUALITY CONTROL

With extensive experience over many years, Twintec has defined quality control procedures for all stages of production:

Concrete levelling

Working by hand or using a laserscreed machine and efficient flood pour techniques, Twintec can level large areas of concrete in one day maintaining productivity, quality and flatness.

Mechanical topping spreader

Dry-shake topping, a coarse blend of aggregates and cement, is mechanically applied just after the concrete has been poured and initially levelled. This suppresses fibres at the floor slab's surface as well as improving abrasion resistance.

Finishing and flatness

Highly skilled workers powerfloat finish the floor slab. For high tolerance floor slabs, while the concrete is still plastic, Twintec's experienced finishing team flatten and densify the surface. With this step, the highest flatness tolerances are achieved with **NO REMEDIAL GRINDING.**

Twintec develop and build machinery in-house to satisfy high performance requirements.

Pre pouring

- Concrete composition, grading, analysis and trials
- Final regulating layer approved
- Joints and formwork checked
- Weatherproofing inspected
- Plant and equipment tested
- Column isolation and perimeter wall detailing

During slab pour

- Fibre integration monitored
- Concrete testing (slumps, cubes, temperature)
- Joints and concrete levels
- Polythene inspected

Post slab pour

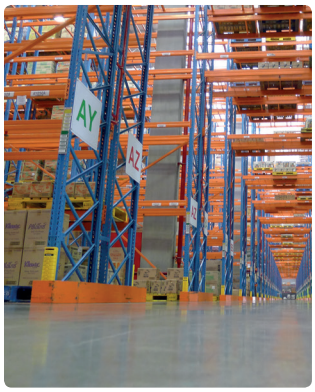
- Slab inspections
- Surveys (flatness, abrasion resistance) if required

Freeplan®

'JOINTLESS' SFRC GROUND BEARING FLOOR SLAB

Twintec's Freeplan® floor slabs offer exceptional durability and performance with **no sawn-induced contraction joints**.

Freeplan® floors are cast in large areas using steel fibre reinforced concrete. They do not require traditional sawn-induced contraction joints, which are a major cause of floor problems. Due to practical limitations on the area that can be constructed at any one time, Twintec uses steel armoured construction joints at the edges of each panel.



With proven expertise in design, concrete behaviour and SFRC technology, as well as strict monitoring and control over production, Twintec can construct floor slabs with panel sizes of up to 2500m^2, depending on concrete quality and availability.

Advantages:

Reduced maintenance costs

Uniformly mixed steel fibres eliminate the need for sawn-induced contraction joints, which are a leading cause of floor problems and the biggest cost for ongoing maintenance on both floor and equipment.

MHE efficiency

With no sawn-induced contraction joints, and steel armoured construction joints at the edges of each panel only, MHE equipment can operate at optimum efficiency.

Faster production time

With reinforcement from steel fibres incorporated into the concrete, there is no need for steel reinforcement to be placed prior to concrete works and continuous large panel pouring is achieved, providing a safer working environment.

Freeplan S®

'JOINTLESS' SFRC GROUND FLOOR SLAB SUSPENDED ON PILES

Freeplan S® A high performance 'jointless' concrete ground floor slab suspended on piles.

Twintec is renowned for developing processes and material technology for ground bearing floor slabs suspended on piles. In-house engineers work closely with the project team in the early design stage to design the best solution for each customer's project, with the appropriate pile types, pile spacing and interfaces such as edge beams.

Freeplan S® floors use structural steel fibres that have been developed and tested for structural applications.

Twintec can provide design optimised piling solutions, offering a complete solution.

Improved long term flatness tolerances

SFRC reduces plastic settlement, leading to greater achievable flatness tolerances and no remedial grinding.

Enhanced sustainability

Reduced slab thickness, cement replacement and the option to use re-valued fibres.

Optimised design

A number of cost benefits through value engineered solutions, including increased productivity, thinner floor slabs which require less concrete and optimised pile spacing and sizing.

Enhanced durability

Steel fibres uniformly throughout concrete provide increased impact resistance.

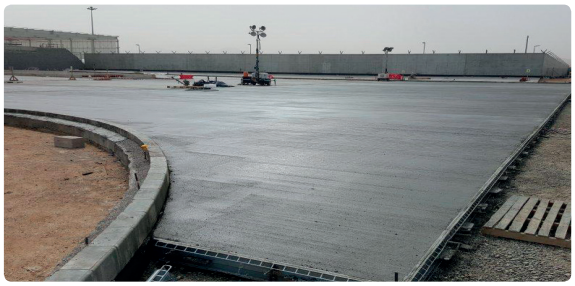
Freeplan XT®

'JOINTLESS' SFRC EXTERNAL YARD

Freeplan XT® is Twintec's 'jointless' SFRC solution developed for both ground bearing and suspended external yards.

To optimise efficiency, Twintec's in-house engineers provide expert guidance on levels and gradients, which can result in output of typically 2000m^2 per day with panel sizes of up to 30m x 30m.

- 75% fewer joints than traditional external yard slabs
- Versatile surface with minimal risk of joint breakdown



Advantages:

Reduced maintenance costs

Up to 75% fewer joints when compared to traditional construction methods. Less ongoing maintenance costs and business disruption.

Improved ride quality

For MHE and vehicles, improved quality of movement across the slab.

Faster production time

80% less preparation time, fibres incorporated directly into the concrete combined with Twintec production processes equals faster production output.

Cost effective

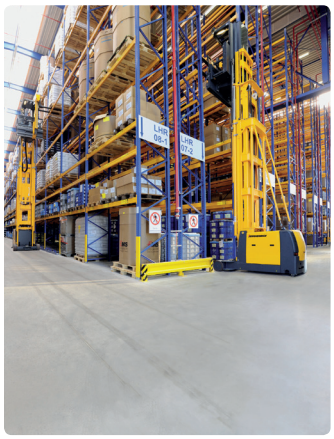
Reduced slab depth compared to traditional construction.

Twinplan® & Twinplan S®

'JOINTLESS' DEFINED MOVEMENT SFRC FLOOR SLAB

Twinplan® large panel floors meet requirements for high tolerance floor flatness, levelness and operational demands in very narrow aisles (VNA) racking areas that have mechanical handling equipment that run on defined movement floors and fixed pathways in between the racking.

VNA applications represent one of industrial flooring's biggest challenges; experiencing very high traffic and load demands and industry standards demand floors for VNA traffic to be extremely flat and level.



For ground bearing (Twinplan®) and slabs suspended on piles (Twinplan S®) Twintec works with clients to find the solutions best suited for them based on their selected racking systems, as well as vehicle types and expected movements.

No Sawn-Induced Contraction Joints
No Remedial Grinding

VNA Racking Height	UK Concrete Society TR34 4th Edition	German Din Standards	ACI Fmin
Over 13m	DM1	VDMA-DIN EN 15620	Fmin 100
8m to 13m	DM2	DIN 15185-VDMA-DIN EN 15620	Fmin 75
Below 8m	DM3	DIN 15185	Fmin 50

Twintec's unique specialist flatness teams work on the surface of the concrete floor before it hardens to ensure conformance to highest flatness tolerance requirements with no remedial grinding.

Twintec ULTIMATE®

SEAMLESS FLOOR SLAB

Twintec ULTIMATE® is the latest in a long line of Twintec innovations in concrete floor slab design and achieves the end user's ultimate requirements for a totally seamless floor slab without any opening joints across the whole floor slab area.

No Sawn-Induced Contraction Joints
No Construction Joints

The floor slab design combines high performance steel fibres with steel mesh and a tried and tested concrete mix design that controls the concrete to deliver a seamless finish. The use of top mesh within the slab offers significantly improved crack control allowing a maximum crack opening within the floor slab to be guaranteed.

Suitable for ground bearing and slabs suspended on piles.

Advantages:

Further reduced life cost

No opening joints or saw cuts means that no joint sealing is required. A totally seamless floor slab will reduce ongoing maintenance to MHE equipment as not trafficking over **any** joints.

Seamless/Joint Free

No opening construction joints or sawn-induced contraction joints across the floor slab resulting in higher business operational efficiencies and reduced maintenance.

Cost effective

Twintec design solutions can reduce the slab thickness compared to traditionally designed floor slabs.

Twintec STRUCTURAL®

SFRC STRUCTURAL FOUNDATIONS

Twintec STRUCTURAL® combines quality concrete with high performance fibres at high dosages to produce slabs that can support high structural loads and ensure foundation stability for a wide number of applications.

Steel fibres combined with local reinforcement for the peaks of stresses ties the slab to the rest of the structure. This, together with the concrete and the latest concrete admixtures, ensures an important gain in material properties such as flexural and shear capacity, resistance to impact and fatigue as well as the control of shrinkage and thermal internal stresses. It is ideally suited to large structures where elements are spanning in both directions due to the multi-directional dispersion of the fibre reinforcement.

Applications for structural slabs:

- Cladrack systems
- Multi-storey building foundations – residential, malls, car parks, hotels etc…
- Ground foundations – silos, tanks, wind turbines, water treatment plants
- Container storage foundations

Advantages:

Value engineered designs

Objective design for each individual case based on detailed engineering and subsoil test results, resulting in reduced slab depth.

Faster production time

80% reduction in programme time compared to traditional steel re-bar design solutions.

Enhanced sustainability

Significant reduction in use of steel by use of steel fibres instead of heavy rebar.
Reduced slab depth equates to substantial reduction in volume of concrete required.

Twintec PLUS®

'JOINTLESS' CONCRETE FLOORING WITH SURFACE ENHANCER

Twintec PLUS® Low maintenance and durable - all the benefits of a Twintec floor PLUS a surface enhancer.

- Enhances appearance, strength and abrasion resistance
- Lower maintenence costs
- Easy tyre mark removal
- Reduction in electricity consumption due to high reflectivity
- Antislip - DIN51131 - valuation SAFE
- Water and oil penetration reduced by 90% (DIN 52617, DIN EN 150 15148)

Advantages:

Low maintenance and cost effective

Improves overall life cost of the floor, easy to clean off tyre marks and will not chip or flake over time.

Durable

Will not only dramatically improve the appearance of the concrete floor, but also increase the hardness, density and have a higher abrasion resistance.

Environmentally credible

A justifiable sustainable flooring option as utilises materials already present in the concrete. An environmentally friendly solution due to the high reflectivity of the floor surface. It will help to reduce electricity consumption and significantly lower output of CO_2.

Twintec ECO®

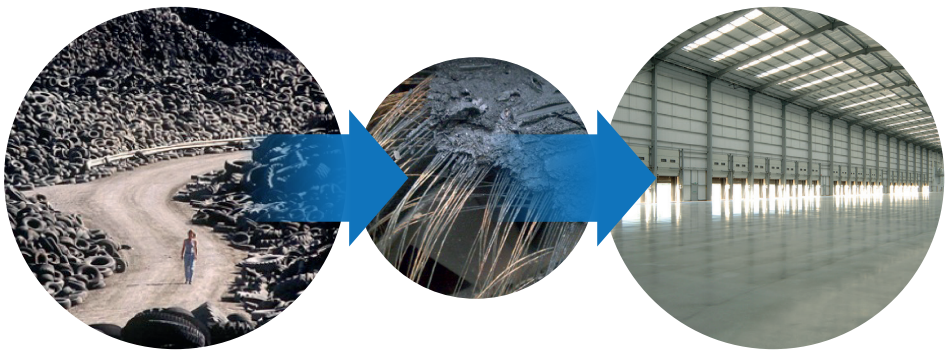
FLOORING WITH REDUCED ENVIRONMENTAL IMPACT

Twintec ECO® floor reuses steel cord from tyres in floor slab construction to produce steel fibre reinforced concrete (SFRC) - all the benefits of a Twintec floor plus a reduced environmental impact.

Twintec is committed to developing sustainable solutions to floor slab design as a fundamental part of business practice. The development and introduction of the Twincon fibre as a standard offering demonstrates Twintec's drive to minimise the environmental impact of design and contracting operations.

- Very high strength wire
- Increased distribution helps to control crack initiation
- Tested in accordance with latest design guidance
- Significant environmental benefits

Revalued steel fibre that use 98% less energy and releases less CO_2



From this... **...to this**

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- Bahrain
- Belgium
- Brazil
- Canada
- Czech Republic
- Denmark
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