



**BLASTEC**

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*Integrated protection systems*

ANALYSIS AND DESIGN

OFFSET BLAST MITIGATION

MASONRY REINFORCEMENT TECHNIQUE

INTEGRATED HARDENING

**CINTEC**  
REINFORCEMENT SYSTEMS

# RELIABILITY AND PERMANENCE



The intrinsic qualities of the Cintec Anchor are well documented through years of extensive testing. With each project and application, from high-rise buildings, to ancient masonry structures, to bridges and retaining walls, Cintec ensures that the scientific processes behind the methodology are proven to be effective.



## PERMANENCE

An independent study carried out by Building Research Establishment involved accelerated age testing. This simulated a forty year aging cycle and confirmed the anchors' long term performance.



## DURABILITY

### FREEZE - THAW

Following rigorous testing in North America by ArconTEST Incorporated, the report on the Uni-directional Freeze-thaw Performance of Cintec Masonry Anchors (to EN 772) found no appreciable loss of grout or encasing brickwork after a full 100-cycle test.



### FIRE

Fire testing at the Building Research Establishment (U.K.) in 1993 confirm that the Cintec Anchor System, when installed correctly, meets a fire period requirement of up to 2 hours, at 160°C (212°F).



## TRAINING AND EXPERIENCE

Our training program ensures that every installer of the Cintec Anchor System has complete knowledge and hands-on experience.

Every installer is required to carry an identification card on site while undertaking work requiring the use of the Cintec Anchor System.



## AWARD-WINNING TECHNOLOGY

Cintec has been honoured with a number of coveted awards for engineering and design.

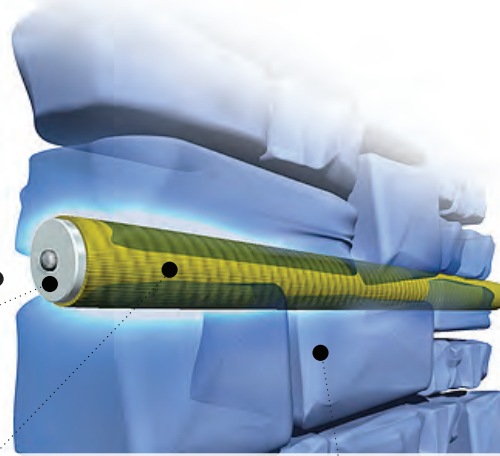


# CINTEC MASONRY REINFORCEMENT TECHNIQUE

## THE PRINCIPLE

The Cintec masonry reinforcement technique (MRT) strengthens structures to make them more resistant to internal and external explosions.

With over thirty years of development and application, it has been custom designed for a wide range of structures, from cathedrals, to viaducts, to commercial high-rises.



### precise drilling

Based on detailed study and structural modelling, holes are drilled through supporting walls. This is done with high-precision coring techniques.

### the steel core

The tension and stress properties of the anchor are precisely matched to the parent masonry. Its strength and durability has been proven time and again through real-world application and extensive testing.

### the sleeve

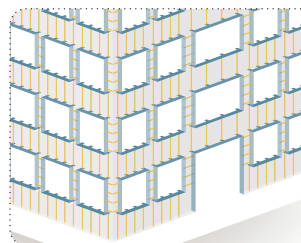
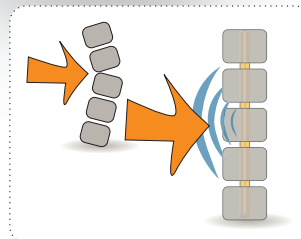
A woven polyester sleeve is filled with grout, moulding to the shapes within the walls. With the seepage of grout through its porous material, it creates both a chemical and a mechanical bond.

### integrated strength

Now reinforced from within, the structure is capable of meeting seismic and explosion forces far beyond its previous capacity. It can be integrated with windows and doorways, providing a complete protection envelope.

## THE RESULT

- Cintec is able to reinforce any type of masonry wall, including brick, stone, terra-cotta and CMU, creating an internal skeletal steel frame capable of resisting out-of-plane loads.
- The Cintec MRT is invisible. This makes it the first choice for historical and architecturally important structures.
- The Cintec Anchor System aggregates protective elements such as reinforced windows to create a unified blast-resistant entity.
- Cintec's MRT can also be installed in occupied buildings without the need to move personnel away from the work area, eliminating the need for 'swing space' and possible compromise of sensitive or classified operation.



BLASTEC



CINTEC ANCHOR™

# ANALYSIS AND DESIGN

The determination of an appropriate blast protection system for any structure requires both a blast mitigation study, and structural analysis. Cintec provides both those essential areas of research.

## BLAST MITIGATION STUDY

In response to an identified range of explosive threat, Cintec produces a detailed blast mitigation study. This is undertaken either as part of an analysis and design consultancy, or as a separate study to investigate blast load and distance combinations.

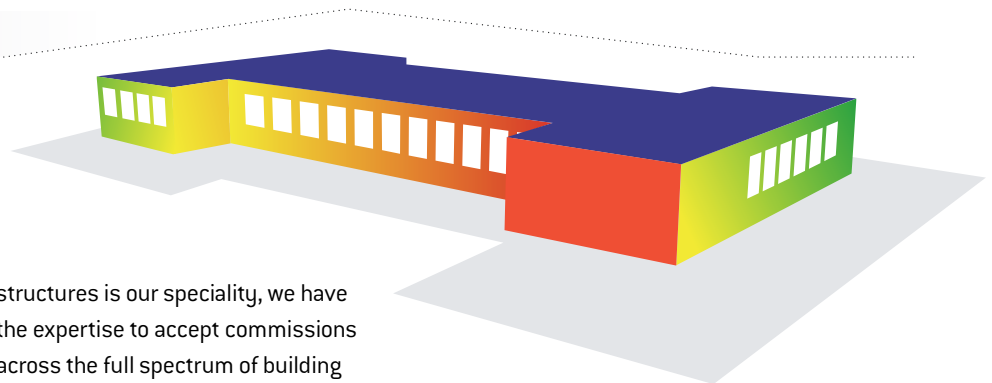


## STRUCTURAL ANALYSIS

Once this area-wide study is complete, the vulnerable parts of the threatened structure are analysed in detail using a combination of discrete element, finite element and single-degree-of-freedom models supplemented by product tests where appropriate.

The Blastec system is arguably the only one in the world capable of modelling accurately the complex behaviour of masonry structures exposed to explosive loads. Although retrofitting masonry

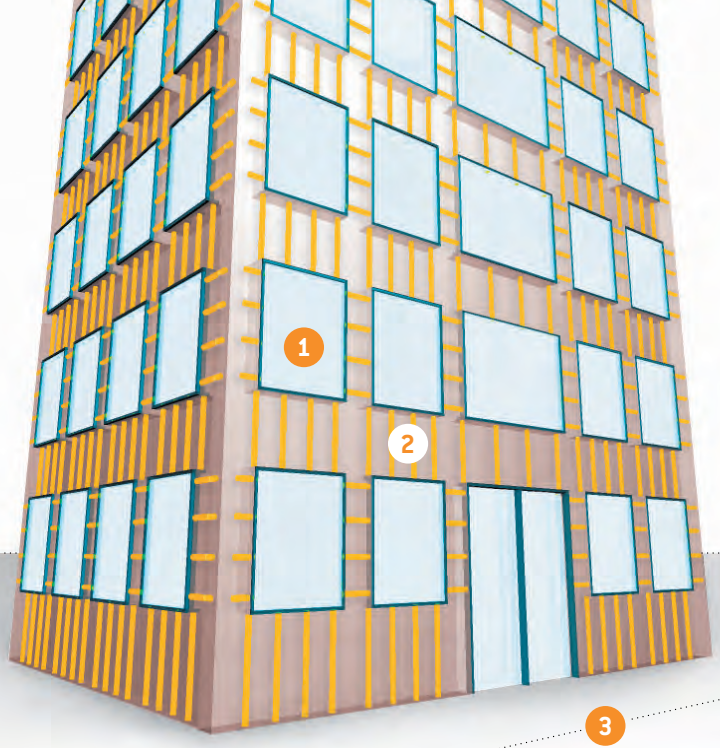
structures is our speciality, we have the expertise to accept commissions across the full spectrum of building types and environments, from simple single storey buildings to complex multi-floor industrial framed structures, in all materials including steel, reinforced concrete, and masonry.



- No damage
- Low damage
- Medium damage
- High damage
- Total destruction

# SECURING WINDOWS

*Securing windows goes beyond the glass*



START

DEFINE RISK

BLAST MITIGATION SURVEY

1

## ARE THE WINDOWS SAFE?

Cintec works with leading blast window, film and laminate manufacturers to upgrade window safety. Applications include signal defense technology to government requirements for TEMPEST control, temporary solutions such as laminates or film, and permanent blast proof windows.

2

## ARE THE WALLS SAFE?

Cintec surgically strengthens the window aperture, as well as fixing the window frame to embedded Cintec blast-window anchors.

3

## IS THE STRUCTURE SAFE?

Cintec anchors create the structural redundancy necessary to resist large blast loads.



## FINISH

These three components make up a reasonable precaution to minimise damage and loss of life.

Cintec methods can achieve this without a visual indication of upgrades.

CINTEC



BLASTECH



CINTEC ANCHOR

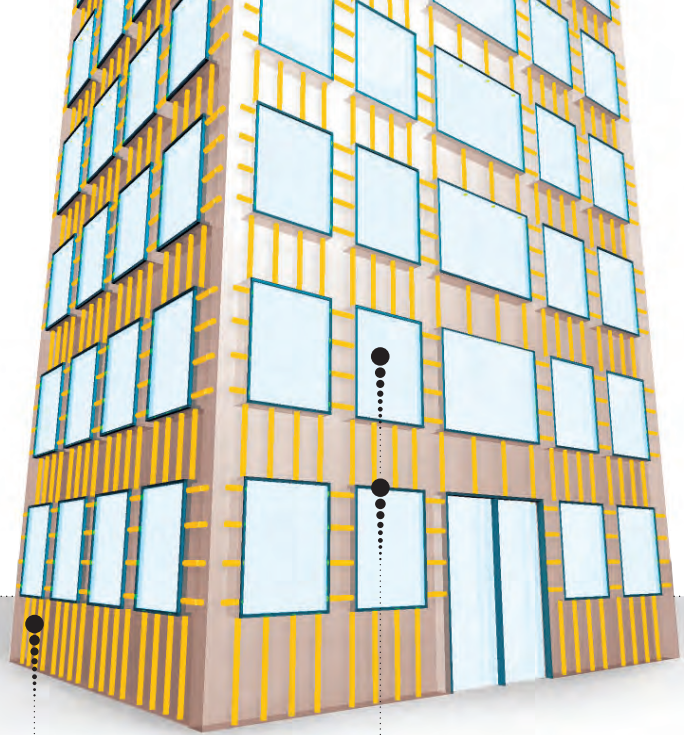


WINDOW UPGRADE

# BLASTEC IS COMPLETE PROTECTION

For over thirty years, Cintec has been at the forefront of structural strengthening techniques.

Blastec, the blast mitigation division, is an industry leader in aggregating specialised technologies to create a unified system of blast protection.



## ANALYSIS AND DESIGN

CINTEC ENGINEERING



The Blastec System begins with structural analysis and design.

Once an explosive threat has been identified, building owners, occupants, law enforcement agencies and security personnel will want to know how the threatened structures will respond when subjected to adverse explosive loads.

Blastec's structural engineers have many years of international civilian and military experience gained in the analysis and design of structures subjected to weapons effects.

## OFFSET BLAST MITIGATION

WATERWALL



With Waterwall, offset protection against blast can be achieved quickly and economically. Waterwall reduces the power of a blast and its ensuing pressure wave in two ways:

- the high mass of water redirects the blast wave away from the protected site,
- the water interacts on a chemical level to dampen the power of a blast.

Waterwall is unrivalled in its ease of setup and customisation for a wide range of applications.

## MASONRY REINFORCEMENT TECHNIQUE

THE CINTEC ANCHOR



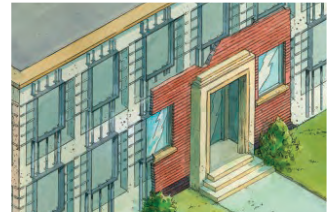
With more than thirty years of development, the Cintec Anchor surgically reinforces structures from within.

Following detailed engineering analysis, unobtrusive holes are precisely bored through the structure. Steel bars sleeved with woven fabric are fed through the holes, then injected with grout.

The result is an internally strengthened structure, with no aesthetic impact.

## INTEGRATED HARDENING

SPECIALIST COLLABORATION



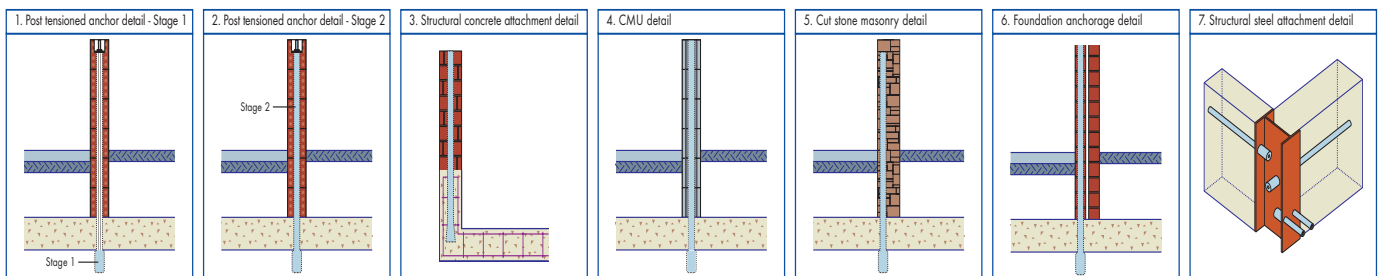
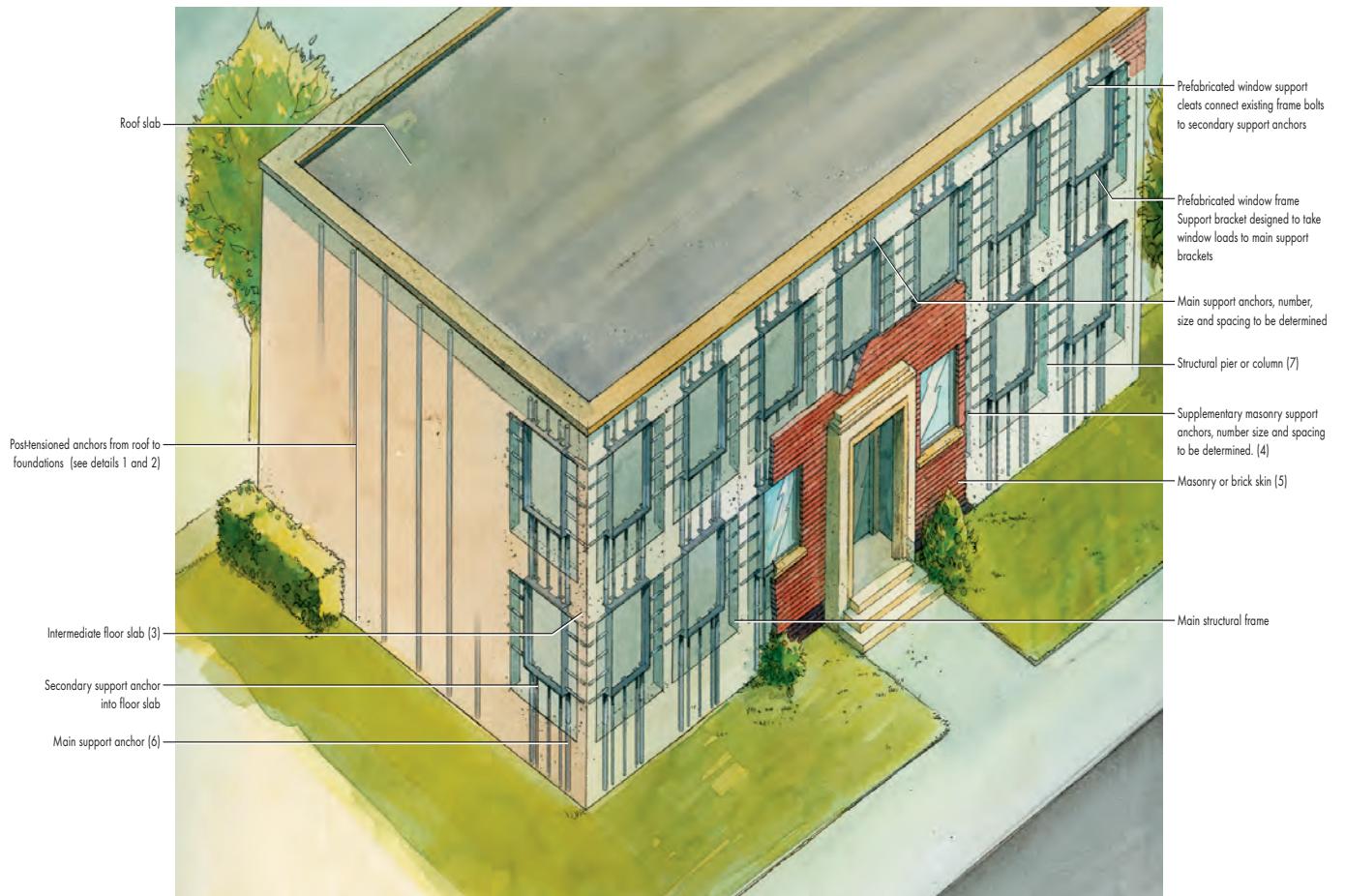
The Cintec Anchor ties together all the elements of a structure, creating an equalised resistance to explosion.

For example, blast-resistant windows remain affixed firmly to their housing by anchoring framing with Cintec Anchors. Post blast intrusion is prevented.

Cintec works closely with leading blast protection companies to integrate all specialised areas of blast protection.



## Design of CINTEC Retrofit Systems and Products





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