

Bi-Steel Security & Defence

Bi-Steel Perimeter and Stand-off Protection

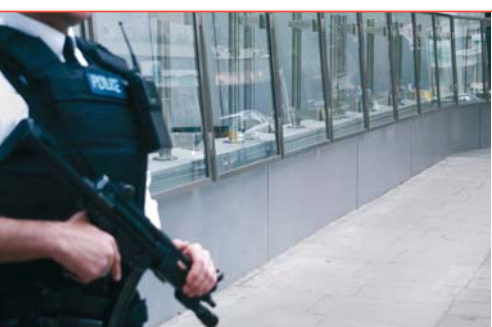
Security by design - providing robust protection
from blast and vehicle borne explosive attack





Protecting life Protecting assets

**Bi-Steel - unrivalled protection against
VBIED attack and explosive blast**



Left and right: Crowded places are vulnerable to a range of threats



Above: Effective security measures are required to protect people, property and assets

Keeping society safe

The threat from terrorist attack is one of the most serious issues facing society today. The threat is still very real and measures are continually being put in place to ensure people, property and assets are protected. Typical extremist targets - key government, public and commercial buildings - are always at some risk, as are parts of our critical national infrastructure (CNI) such as major transport hubs including airports, ports and rail stations. The need to ensure the continuity of electricity and gas supplies, the provision of water and safeguarding of telecommunications services is paramount. Security measures must therefore be put in place to protect these potential targets against a variety of attack scenarios.

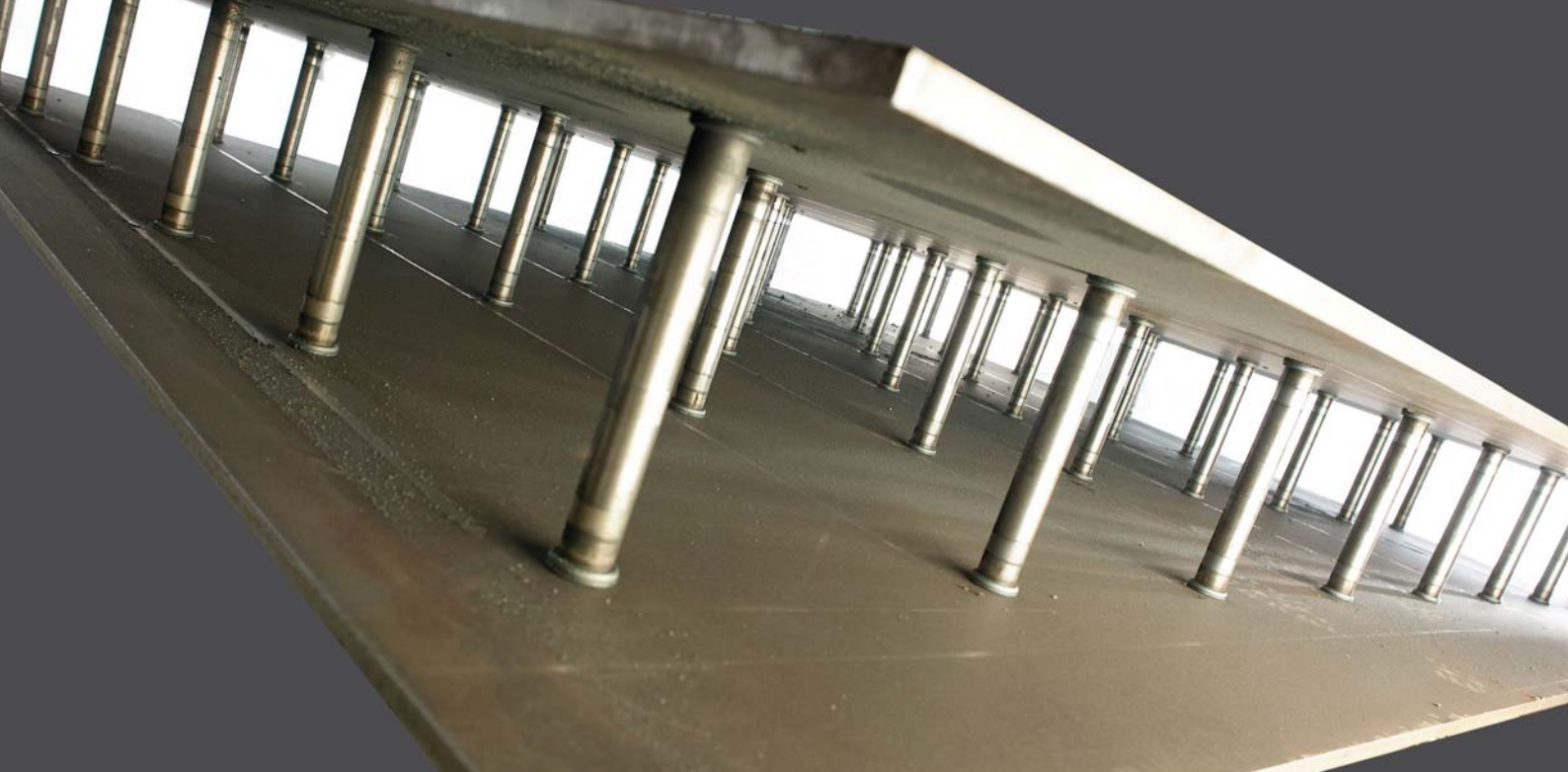
In addition, adequate protection against attack by vehicle borne improvised explosive device (VBIED) must be provided for members of the public as they go about their daily lives. This involves protection for crowded places such as shopping centres, sports arenas, visitor attractions, bars and restaurants, indeed for all locations where people gather together in numbers.

The concept of 'security by design' helps organisations to meet their duty holder obligations to safeguard the public. This approach calls for security to be considered as part of the design process to ensure that structures, whether new or existing, incorporate adequate measures to protect from blast, and that site perimeters are suitably secured from unauthorised vehicle access.

Bi-Steel protective solutions

Effective perimeter and stand-off protection are key to minimising the possibility of attack by VBIED, and to mitigating the effects of explosive blast. This means installing an appropriate anti-attack vehicle protective solution, which may consist of permanent bollards or walls, or redeployable barriers. To meet this need, Corus has developed a unique range of protective solutions that delivers 'security by design' using its patented Bi-Steel steel/concrete composite material. These solutions meet or exceed the highest industry performance standards.





Above: A Bi-Steel panel

Bi-Steel - a unique, high performance blast protective material

What is Bi-Steel?

Bi-Steel was developed to provide the highest levels of protection from explosive blast. A Corus-patented construction material, Bi-Steel comprises two steel plates that are permanently connected together to form panels by an array of friction welded transverse bars. These panels are then filled with concrete to create a construction material with outstanding strength. The resulting composite offers unrivalled protection against explosive blast.

The unique anti-blast and impact resistant qualities of Bi-Steel make it ideal as a high performance anti-attack vehicle barrier system. Containment of concrete within the Bi-Steel units prevents consequential concrete spalling under vehicle impact and blast, thus minimising the formation of dangerous secondary projectiles.

Unrivalled performance

The range has been extensively tested and meets the requirements of the relevant agencies operating within the UK defence and security sectors.

- **Blast protection** - Bi-Steel offers superior blast protection and is approved for use by the UK and US governments for protective buildings work.
- **Vehicle impact** - Bi-Steel meets the performance standards of PAS 68:2007*, the accepted UK classification system for vehicle security barriers and their supporting foundations when subjected to horizontal impact.

For security purposes testing criteria is not published but can be discussed with potential clients.



Above: Surface damage to reinforced concrete (top) and to Bi-Steel (bottom) after a close-in explosion

* PAS 68:2007 - specification for vehicle security barriers

This Publicly Available Specification (PAS) has been prepared to address the needs of organisations who wish to have assurance that vehicle security barriers will provide the level of impact resistance that they seek. PAS 68 specifies a classification system for the performance of vehicle security barriers and their supporting foundations when subjected to a single horizontal impact. This PAS identifies impact test tolerances and vehicle performance criteria that need to be met in order to conform to it. Design guidance is provided in PAS 69:2006.



Above: Bi-Steel protective solutions

Systems to meet every need

Corus offers a wide range of robust, market-leading solutions. These include permanent bollards and walls, redeployable barriers, and heavy-duty gates.

The permanent bollards and walls are fixed solutions installed around key buildings or sites. They require minimal depth/width foundations due to the high strength of the Bi-Steel panels, thus facilitating rapid installation.

The redeployable barriers and gates are designed to be used on a short or medium term basis at events such as party political conferences, state visits, demonstrations and sports meetings. They can be easily transported to site by truck and then quickly deployed.

Right: Bi-Steel vehicle stopping solutions are tested and proven



Permanent perimeter and stand-off protection

Bi-Steel anti-attack vehicle bollards and walls



Bi-Steel bollard and wall systems offer high levels of stand-off and site perimeter protection at security-sensitive locations. They provide industry-leading standards of performance, easily meeting the requirements of PAS 68, and deliver superior protection from explosive blast, VBIED attack and unauthorised access. Bi-Steel perimeter protection systems have been installed at crowded places within city centre locations as well as at transport hubs, industrial facilities and government and defence establishments. Many of these projects provide robust physical protection, hence protecting life, property and operational continuity. At each location the Bi-Steel system is providing an effective and highly reliable solution to the client's individual needs.

Bi-Steel bollard system

The high strength capabilities of this steel/concrete composite material have enabled the creation of a unique shallow foundation design into which PAS 68 approved bollards can be directly fixed - these can be supplied by Bi-Steel or directly from the manufacturer.

Bi-Steel bollard foundation units are designed as standard modules that deliver a straight line of bollards positioned at regular intervals. However, variants are supplied to include curved units for use at road entrances and junctions and a variety of bespoke units can be supplied to meet specific streetscape requirements. Bi-Steel bollard foundation units can also be used in conjunction with Bi-Steel wall systems offering a wide range of solutions.

The compact modular Bi-Steel bollard foundation units are easy and rapid to install. Once in position, Bi-Steel panels within the foundation units are concrete filled, as well as back filling the narrow trench in which they are located. The Bi-Steel PAS 68 tested bollard foundation requires less than 40% of the groundwork excavation compared with an equivalent PAS 68 reinforced concrete foundation.

Bi-Steel's high strength and the resulting smaller footprint reduces the need to re-route local utilities (such as power/gas supplies and communications cables) located underneath the pavement. Rapid installation reduces disruption as well as enabling savings to be made on both project programme time and budget.

Ultra shallow Bi-Steel units are currently in development for locations where minimal service disruption is paramount or where there is no opportunity to excavate foundations. These foundation units can be removed if occasional access to underground services is required.



Above: Bi-Steel bollard system

Left: Bi-Steel bollard foundation units



Bi-Steel wall system

This permanent system consists of fixed walls, which are installed onto pre-fabricated mini pile foundations.

A variety of wall configurations is available to meet individual requirements, ranging from standard blast walls, to highly engineered solutions providing unrivalled protection for security-sensitive sites. The Bi-Steel walls have been carefully designed to blend aesthetically into the local environment and can be painted, clad in brick or stone, or cement rendered in keeping with the surrounding streetscape. In addition to the standard walls, balustrade and bespoke design options are also available. The wall system can be used in conjunction with the Bi-Steel bollard system to provide a wide range of solutions.

Modular, offsite manufactured Bi-Steel wall units are easy to position. The rapid-install mini-pile foundations are based on a simple steel post foundation technique requiring minimal excavation. This helps reduce any requirements to re-route local utilities (such as power/gas supplies and communications cables), which can enable savings to be made on both project programme time and budget. Once in position, the Bi-Steel units are filled with concrete to provide vehicle impact and blast resistant walls for perimeter and stand-off protection.

Benefits

- Security that blends with the streetscape
- Unrivalled protection against VBIED attack, unauthorised vehicle access and explosive blast
- Successfully tested in accordance with PAS 68:2007
- Containment of concrete within the Bi-Steel wall units prevents spalling under vehicle impact and blast, thus minimising the formation of dangerous secondary projectiles
- Modular offsite construction enables rapid onsite installation
- Bi-Steel high strength foundations require minimal excavation, reduce the need to divert utilities and services and enable project programme and budget savings

Above and right: Bi-Steel walls clad to provide discreet protection





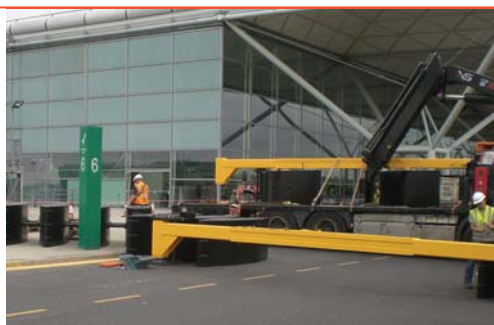
Redeployable perimeter and stand-off protection

Bi-Steel anti-attack vehicle barriers

Bi-Steel's redeployable perimeter protection system has been developed to provide superior protection against VBIED attack, and against explosive blast. Its design meets key user requirements for rapid, temporary deployment, effective vehicle stopping and protection of people and assets against explosive attack. This robust system can be deployed quickly and with

minimum disruption, typically on a short or medium term basis, providing an ideal solution for crowded places and security-sensitive events.

Bi-Steel anti-attack vehicle barriers are currently in use to protect key government locations, military bases, and major UK airports.



Above, left and right:
Bi-Steel anti-attack
vehicle barriers



The system incorporates anti-attack vehicle barriers and gates designed to control or prevent vehicle access to security-sensitive locations, and to protect from explosive blast.

- **Straight and curved barrier units** - control traffic effectively across a variety of road layouts.
- **Heavy duty barge shaped units** - protect against 'head on' impact at the most vulnerable locations. The nose of the unit causes energy to be absorbed by crushing the impacted vehicle.
- **Gates** - provide a high level of protection whilst facilitating quick and easy authorised vehicle access. These incorporate heavy steel sections and robust hinge and locking points attached to the barge shaped vehicle stopping barriers. The steel beam absorbs the impact energy of the vehicle by bending.

Careful design of the system has negated the need for securing points, eliminating road surface fixings. The highly redeployable nature of the system means it can be put into position quickly and then subsequently moved or reconfigured as the need arises.

Benefits

- Unrivalled protection against VBIED attack, unauthorised vehicle access and explosive blast
- Range of barge, straight or curved shaped units enables schemes to be designed to meet the needs of different site perimeters
- Containment of concrete within the barrier units prevents spalling under vehicle impact and blast, thus minimising the formation of dangerous secondary projectiles
- Bi-Steel's high strength properties deliver the required protection with a significantly smaller footprint compared with reinforced concrete alternatives
- Can be suitably painted or finished to blend in with local streetscape
- Units are transported to site by truck with an extendable hydraulic lifting arm for quick and easy installation





Profit from our expertise

Bi-Steel – a total protective security solution

In today's challenging security environment, where the world is facing a new range of threats from terrorists and criminals, the need to fully protect people and assets is vital. Bi-Steel can assist in achieving this goal by providing robust physical protection for key locations and crowded places, thus protecting life, property and operational continuity.

Security by design

The integration of Bi-Steel within a security strategy helps reduce risk to a level that is As Low As Reasonably Practical (ALARP).

In designing a security solution to meet each individual client's protection requirements, Bi-Steel will:

- Develop a protection strategy
- Assess blast interaction
- Quantify loading on structural components
- Specify and design the Bi-Steel protection solution

Experienced engineering team

Bi-Steel has a highly experienced and passionate technical team, including experts in blast engineering, structural and civil engineering, and security matters, who will provide a full schedule of specifications, with drawings. Bi-Steel can also act as a sub-contractor for installation, working with specialist project partners who are experts in their particular fields.



Above, left and right: Bi-Steel's technical, design and delivery teams provide total security solutions

Right: Corus manufacturing facilities operate to world-class standards



Quality and integrity

Corus is one of the world's leading steel producers and a major UK company. Operating to the highest international quality and manufacturing standards we are committed to offering the very best in customer service and support.

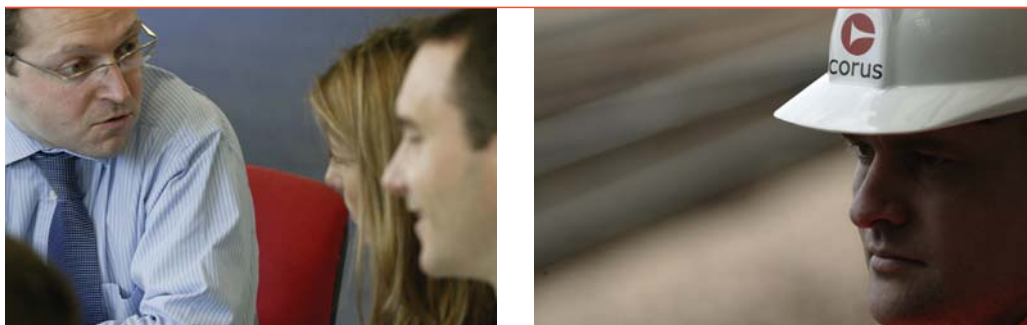
Value added solutions

At every stage of the project we work in close collaboration with our clients, providing technical advice and consultancy that delivers successful results.

Backed by an unrivalled reputation in steel, Corus is in a unique position to provide added value to our clients by delivering dependable and highly cost effective solutions.

Contact us

For the latest information on Bi-Steel call us on +44 (0) 1344 751670.



www.corussecurity.com

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