White Paper

ENSURING THE LIFETIME PERFORMANCE OF HIGH SECURITY PERIMETERS

A practical perspective on the often overlooked topic of specification, installation and maintenance of perimeter security products to ensure they perform to their designed specification throughout their service life.

Jacksons Fencing

About Jacksons

Jacksons Fencing is a family business founded in 1947 in Kent.

Today, the company operates from three UK locations -Ashford, Bath and Chester - and employs over 250 people in the design, manufacture and installation of timber and steel fencing, gates, environmental noise barriers, bollards, automation and access control solutions.

Our portfolio extends from decorative garden fencing to Secured by Design approved and LPS1175 Issue 8 certified fencing systems (at Security Ratings A1-E10 (SR1-SR5), to the highest security systems approved for use by UK Government.

In addition, we offer one of the few shallow foundation design PAS 68 crash fences on the market, PAS 68 rated bollards, speed gates and acoustic barriers for residential, commercial, industrial, security and highways applications.

Serving customers and clients around the world

From retail consumers to architects, construction companies and security advisers in over 30 countries around the world across a huge variety of applications from homes, schools, commerce and industry to the most secure critical infrastructure sites.

As you would expect, we are a professional and ethical company, accredited to all relevant professional, quality and safety institutions and industry schemes.

Sustainability and value

In terms of high-security perimeters, what makes us a little different to the rest of the industry is that we are the only manufacturer to design and manufacture tested and rated security fencing systems employing a combination of timber and steel – something that can make a big difference between presenting an overt high-security deterrent or projecting a softer, more friendly image.

We are the only fencing company to offer 25 year guarantees on both our timber and steel manufactured products – evidence that we place responsibility for the environment and contribution to sustainability just as much at the heart of our business as the products and solutions we offer.

Design, standards, materials and inspection

With the plethora of LPS 1175 and PAS 68 certified, UK Government approved and Secured by Design preferred products available on the market ,and the ever increasing 'noise' around electronic detection and surveillance systems, this document takes a down to earth perspective on the often overlooked topic of specification, installation, and maintenance of perimeter security products, to ensure they perform to their designed specification throughout their service life.

Topics and products covered in this document include:

- Perimeter security design and installation specifically, fencing, gates and vehicle barriers
- The standards applied to evaluating the performance of perimeter security product
- Show materials and their treatment affect the resilience and lifetime performance of perimeter security products
- Importance of inspection and the role scheduled maintenance and repair plays in the integrity of perimeter security products

Assessing the requirement for tested, certified or approved perimeter security products

The specifying of tested and certified fencing, gates and barriers has become increasingly commonplace and not just in higher security applications.

However, it should be noted that the testing of perimeter security products is not carried out in a "controlled environment" but are to a standard and replicable procedure which aims to ensure that all products are tested equally.

When considering security of a perimeter the first steps are to undertake the Operational Requirement (OR1); effectively an overview to determine the requirement for security, then OR2 to identify specific requirements at all points around the site.

Once the specific requirements have been identified for securing the perimeter, the pedestrian and vehicular access and egress points, the next key stage is to understand the site and how it will impact on the security products considered for use in protecting the assets within.

In general, the factors which will need to be taken in consideration include:

- how the products will blend into the local environment
- location – inland or by the sea where products will be exposed to high levels of salinity
- wind load calculations – whether by the coast, exposed areas or in an urban area
- obstructions and existing structures
- ground conditions in terms of soil type and water table
- subsurface utilities such as electrical and communications cables, water, gas and waste pipes
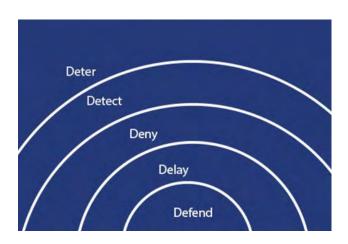
Firm foundations

Like any other outdoor structure exposed to the elements, foundations play a critical part in the performance of perimeter security elements such as fences, gates and vehicle barriers.

Planning for success

In terms of planning an integrated perimeter solution, applying the 'onion skin principle' will allow you to achieve a 5D perimeter able to Deter, Detect, Deny, Delay and Defend against unauthorised access by employing multiple layers of delay and detection to prevent access to protected assets and provide the time and intelligence for an appropriate security response.

Equally, apply common sense to your plans - for example, a 5m high security fence positioned alongside a public road becomes a 1.6m fence if an intruder is able to use a typical box bodied 7.5 tonne truck as a ladder.

Design

Consider how the use of natural or artificial landscaping features and road layouts can often reduce the need for more costly security elements or at least reduce the cost by adjusting the performance rating and number required; physical measures which change the attack vector and reduce the approach speed of a hostile vehicle will significantly mitigate the effect of a vehicle-borne attack.

Site specific requirements

From schools to prisons, many sites will have an Operational Requirement in place which will stipulate specific types of perimeter security to be employed which can include:

• Height of fence
• Fence material and composition (type, material specification, height, topping etc.)
• Colour
• Access/ egress control
• Lighting
• Electronic surveillance
• Perimeter Intrusion Detection Systems (PIDS)

'Conforms', 'Preferred', 'Certified' and 'Approved'

Making sense of security ratings and standards.

These could be conditions imposed by insurers, regulators or in response to advice given by security consultants, police or CPNI.

The main standards applying to security fencing, gates and access control in the UK are:

British Standards Institution (BSI):
'Conforms to BS 1722'

There are numerous parts to British Standards relating to fencing and gates within BS 1722.

Currently, conformance to BS 1722 does not in itself provide an indication of the expected performance of a fence or gate in a security application – it is not a tested and certified rating. It simply serves to establish minimum requirements.

It is relatively easy for these standards to be misinterpreted in the specifying process.

Take BS 1722-14:2006 for example. It details requirements for open mesh steel panel security fences. However one of the key factors which will impact on the performance of the fence as a security barrier, immediately and over time, will be the wire gauge used in the fabric of its mesh construction and the type of protective coating applied to it.

When considering specifying a fence by this standard, be sure to check product descriptions carefully against specification to avoid an inferior and in some cases, less effective product being employed.

Secured by Design:
'Police Preferred Specification'

Secured by Design (SBD) is owned by the National Police Chiefs' Council (NPCC) and is the corporate title for a group of national police projects focusing on the design and security for new and refurbished homes, commercial premises and car parks as well as acknowledgement of quality in security products and crime prevention projects.

Loss Prevention Standard: 'Certified to LPS 1175'

Loss Prevention Standard (LPS) 1175 is a testing regime and certified standard, developed and operated by BRE and administered by the Loss Prevention Certification Board.

It is a testing methodology that provides a time delay ranking for a product according to its resistance to a series of defined attacks employing various hand and portable power tools.

In terms of perimeter security products, the standard provides security classifications ranging from A1, the lowest to H20, the highest. It's worth noting that fences at lower classifications do not necessarily meet with UK Government requirements.

Products tested and certified to LPS 1175 standard (currently on Issue 8) feature in the Loss Prevention Certification Board's 'List of Approved Products and Services' which are published in the 'Red Book' and publicly available online at www.redbooklive.com

'Approved for UK Government Use'

The Centre for the Protection of National Infrastructure (CPNI) assures a range of physical security products for use on critical national infrastructure (CNI) sites through an evaluation, testing, grading and approval process within their Manual Forced Entry Standard (MFES), a new standard which came into effect on the 1st April this year.

Products evaluated, tested and graded by CPNI are listed in their Catalogue of Security Equipment which is not publicly available.

The CPNI trademark and the words 'Approved for UK Government Use' is issued to manufacturers for the identification of specific products which have been successfully evaluated not the company as a whole.

Certified vehicle security barriers

There are currently a number of standards and agreements in operation for the certification of Hostile Vehicle Mitigation (HVM) measures against a Vehicle Borne Improvised Explosive Device (VBIED).

In the UK it is PAS 68, a standard introduced in 2005. In mainland Europe, CWA 16221 has been applied since 2010. In the USA, the ASTM F2656 standard has progressively taken over from the Department of State's 'K' ratings.

However, in November 2013, the International Workshop Agreement or IWA 14 was introduced by International Organization for Standardization (ISO).

IWA 14 combines and updates elements from PAS 68, PAS 69, ASTM F2656 and CWA 16221 as well as new content.

The UK Government is now specifying products tested to ISO IWA 14 Part 1.

All elements of physical perimeter security, no matter what its specification or tested and certified performance is only as good as its installation and in general, will only deliver full effectiveness and security integrity on the day it was commissioned:

• If it isn't inspected regularly, don't assume that it is still doing its job
• If it isn't maintained it will fail
• If it isn't repaired correctly it will not perform to specification

What, therefore are the key considerations when specifying products and what should you watch for over time?

Starting with materials:

Steel:

Other than stainless steel of the appropriate gauge, you need to ensure all steel elements to be installed below ground or exposed above ground are, at the minimum, hot dip galvanised to BS EN 1461 - inside and out and ideally after basic manufacturing is carried out. For example after fence posts and hollow structures like bollards and fixings have been cut to length or welded in place.

Steel wire mesh fence panels and sheet steel:

Whenever practicable, specify a zinc-aluminium alloy coating to BS EN 10224 in preference to standard galvanised – it's significantly more durable and costs only a fraction more.

Powder coated steel:

Powder coating provides a durable, decorative surface treatment but only if it is applied on to a galvanised or zinc aluminium coated base and to BS EN 13438. If not, and at best, the colour coating will peel over time and the product will look unsightly. At worse, the colour coating will remain intact while the unprotected steel beneath the coating rusts away hidden from view. This is especially so, for products sited within 500 metres of an estuary or exposed to salt or other corrosive elements in the atmosphere.

In these cases, specify a specially formulated 'marine coating' onto galvanised or zinc aluminium coated steel for structural integrity and longevity.

Construction:

In terms of design and construction, you should ensure that tamper evident, single use or integral concealed fixings, especially with fencing and gates are employed – you've probably heard the stories of riveted and bolted steel palisade fencing being compromised and providing discrete free entry and exit to a site?

Timber:

Contrary to popular belief, there are LPS 1175 security certified and products approved for UK Government use manufactured in timber and in timber and steel combinations.

With timber, it is essential that the product is manufactured from the right part of the right species of timber, that it is kiln dried sufficiently to accept the optimum volume of chemical treatment against rot and wood boring insects and that the fixtures and fittings are manufactured either of galvanised or stainless steel.

Quality guarantees:

In the case of both timber and steel manufactured products destined for external use in all conditions, it is prudent to specify products backed by a worthwhile guarantee – certified physical security measures are by definition 'critical to operations' and usually form part of the site infrastructure, so imagine the disruption to operations and security if they failed or need to be replaced unexpectedly, let alone the cost implications.

A well maintained perimeter shows that:

* the facility takes security seriously and that the perimeter is regularly accessed by staff.

Inspect the fence line

Inspecting the fence line is the easiest and most obvious maintenance procedure, but it does need to be a scheduled event and from our experience, that's rarely the case. The perimeter needs to be 'walked' and access points 'checked' both from within the site and more important along the attack face – look for attempted breaches.

Note if foliage, weather conditions, natural or man-made topography changes have effected security integrity.

Clear away any litter, debris and dirt, take a note of everything requiring attention in a Condition Report then if necessary, prioritise repairs and remedies.

Inspect and test gates, turnstiles, barriers and blockers

In most higher security applications, the consequences of a gate, turnstile or other entry and egress barrier failing could be extremely serious; far in excess of an irritation or inconvenience.

All gates, vehicle and pedestrian barriers are subject to use and mechanical wear and tear is inevitable. Those equipped with automated operators and control boxes will require additional special attention, not only to maintain security and operational efficiency but also to meet your duty of care obligations to everyone on site – and in these litigious times, that includes both careless users and intruders.

HSE Regulation 18 classes automatic gates and barriers as machinery and as the occupier of the facility you are required under Regulation 5 of the Workplace (Health, Safety and Welfare) Regulations 1992 and European Directive EN 13241-1 to ensure that they are always in safe working order.

Vehicle access barriers in particular will typically be subject to heavy use and abuse, so committing to a formal maintenance and repair schedule should be in addition to regular checking for general wear and tear and carrying out essential repairs – these are key factors to ensuring performance critical products continue to function to their designed specification throughout their service life.

Summary

There are of course operational processes you can adopt to ensure the lifetime performance of a high security perimeter but these processes need to form a part of your security SOPs. Much of it boils down to common sense – the problem with common sense though is that it's not uncommon to forget to apply it until after an event.

The fact that a site contains assets which require protection with security rated products to a certified standard would suggests that if they failed, the consequences could be severe, so to recap on the considerations and measures discussed in this document:

- Ensure the Operational Requirement phases and the Risk Assessment are thorough and provides both for redundancy and resilience
- Know your site, its specific conditions and the areas around it and within it
- Specify and select the appropriate products for their intended purpose and suitability for site conditions
- Check that the product installed meets with the specification ordered
- Do not take shortcuts in the installation of products
- Accept that in general, security products installed won't improve over time - their performance will degrade
- Have a workable recovery plan which takes account of maintenance and repair

Most important, don't assume the products are working just because they haven't failed – inspect, check, test, maintain and repair are the watchwords to ensuring long term security performance and integrity.

Contact Us

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