Introduction

Physical building security often forms the first line of defence against theft and as high a level of physical protection as possible should be sought. The aim is to make illegal entry as difficult, time-consuming and noisy as possible. In addition, the visual aspect of effective building security might dissuade a potential intruder from attempting to break-in in the first place.

The first line of defence for a building is the outer façade, to include the building fabric, entrances and windows. The extent to which physical security improvement is possible will initially be determined by the construction of the building.
Other factors to be taken into consideration include the location of the risk, accessibility of the building, attractiveness of the contents and the nature/extent of other security features such as intruder alarms and on-site security.

In Zurich’s experience, windows and some types of doors can be particularly vulnerable to attack, especially where buildings are in isolated locations, out of normal working hours. Windows can be broken and lightweight or glazed doors can also be overcome. Recessed doorways are also more vulnerable to attack, as intruders are often able to attack the door while out of sight. This Risktopic looks at the precautions that can be taken to improve door and window security through the installation of security grilles and shutters.

**External Protection**

It is important to note that shutters and grilles are only as secure as their locking and fixing mechanisms. Any grilles or shutters that are installed externally are more prone to attack from thieves. Zurich customers have experienced theft losses following removal of externally mounted grilles where they have been pulled from their wall mountings by chains attached to vehicles. This not only removes the security protection but also causes damage to the building structure, resulting in higher remedial costs and more interruption to the business.

While external protection provides a good visual deterrent to thieves, determined miscreants will have more time to overcome external protections as they will not be setting off intruder alarms while attacking the grilles or shutters. For these reasons, Zurich recommend, that where possible, external protection should only be provided where there is a high risk of malicious damage being caused to windows and doors. In this scenario, welded mesh grilles can be used to protect glazing.

**Welded Mesh Grille Specification**

The mesh should be a minimum of 10 gauge (6 gauge for high risk applications) wire diameter, with a maximum mesh size of 25mm x 25mm.

The mesh should be welded into a flat or angled frame, with maximum dimensions of 38mm x 38mm x 3mm, fixed to the building fabric with 76mm long x 9.5mm long masonry grade rawbolts to a depth of 75mm, spaced at intervals no greater than 150mm apart. The heads of the bolts should be defaced to prevent easy, unauthorised removal.

![Figure 1: An external fixed grille, designed to protect glazing from malicious damage.](image)
External Roller Shutters

Where external protection is required for security reasons (as opposed to malicious damage reasons), Zurich strongly recommend that security shutters are used instead of metal bars or grilles. These are more difficult to remove and completely shield doors and windows from attack. Shutters should be approved by the Loss Prevention Certification Board (LPCB) to Loss Prevention Standard (LPS) 1175 and should be secured by a set of shutterguard locks (also known as pin locks). One lock should be fitted to each side channel.

Internal Protection

Secondary internal protection is recommended by Zurich as it offers the highest level of protection against theft of stock and contents when a monitored intruder alarm is also installed. Although doors and windows remain vulnerable to attack, any intruder breaking an intruder alarmed door or window would set off the alarm and still have to overcome the secondary protection of a security grille or shutter. More often than not, the intruder will leave the premises having only caused damage to the outer door or window as they would waste vital minutes in overcoming the secondary protection in the knowledge that the keyholders and Police should already be on their way to the premises. There are various ways of providing internal protection, as follows:

Internal Weldmesh Grilles – Windows

- The weldmesh must be a minimum 10 gauge diameter wire with a maximum mesh size of 50mm x 50mm.
- The mesh should be welded into a flat or angle iron frame with minimum dimensions of 38mm x 38mm x 3mm.
- The frame should be fitted to the building fabric with 76mm long x 9.5mm masonry grade rawlbolts to a depth of 75mm.
- Rawlbolts to be spaced at intervals of not more than 150mm.

Internal Iron Bars – Windows

- Bars should have a minimum diameter of 15mm.
- The centre of the bars should be placed at intervals of not more than 125mm.
- Horizontal iron tie bars should be fitted at intervals of not more than 600mm.
- The bars should be welded to a 5mm steel frame.
- The frame should be secured to the fabric of the building by rawlbolts at intervals of not more than 200mm.
- The rawlbolts should be burred over or welded, to prevent unauthorised removal.

Internal Iron Bars – Skylights

Skylights can also be a weak point in building security, especially where roofs are easily accessible. Iron bars can also be fitted to skylights, as follows:
- Iron bars should have a diameter of at least 18 mm.
- The bars should be spaced at intervals of not more than 125mm.
- 50mm x 10mm flat, horizontal tie bars should be welded at intervals not exceeding 600mm.
- The bars should be set in the masonry of the roof to a depth of at least 50mm or in equivalent quality steel frame, securely anchored by bolting through the roof.

Glazed Doors

Glazed doors are a particular weak spot in building security. Where these are installed they should ideally be replaced with solid timber doors. Where this is not possible, weldmesh protection can be installed as follows:

- Weldmesh size should be a maximum of 50mm x 50mm and should be 6mm thick.
- The mesh should be welded to a substantial iron frame.
- The frame should be secured to the door with dome headed bolts, with the bolt heads being burred over or welded to prevent removal.
- Additional hinges may need to be added to the door to cope with the extra weight.

Industrial Shutters and Up and Over Doors

Many industrial and commercial units have large shutter doors, designed to allow vehicular access to the premises. The picture below shows an example of the type of door that this advice relates to.

![Figure 2: An example of a typical roller shutter/up and over door](image)

These are usually of aluminium or steel construction. Channels/guides should be securely rawl-bolted to the brickwork or frame of the building to prevent an attack on the vulnerable sides. The bottom rail of the shutter should be a heavy gauge angle bar. Locking should be by means of the following:

- Cylinder locks, welded to each channel and/or security padlocks fitted to the bottom rail.
- Lock ring or stud fixed in concrete below ground level, and/or external pad bolts welded to ends of bottom rail with security padlocks.
Some types of this door also have polycarbonate portholes or viewing panels installed. These panels are also prone to attack and can be protected by installing internal weldmesh grilles, which should be welded to steel angle frames. The frames can then be securely bolted to the inside of the shutter door.

**Collapsible Grilles**

These are metal grilles which are able to be locked shut out of business hours, thus providing a good level of physical security. This type of product has the added bonus of being able to be unlocked during working hours, allowing them to collapse sideways, meaning that staff do not have to work in areas with bars at windows. Any collapsible grilles should be approved by the Loss Prevention Certification Board (LPCB) to Loss Prevention Standard (LPS) 1175.

**Internal Portcullis Grilles**

These types of products are suitable for retail risks and can remain in place during business hours, providing protection against smash and grab attacks. It is advisable to fix or strengthen mid-rails for higher risk displays. Locking is by means of a spring action lock bolt into a tongue in the bottom rail. The lock is completely covered by a lowered bottom rail. Fixed internal grilles can be used, however these present problems when windows require cleaning.

![Figure 3: Example of an internal portcullis grille](image)

**Internal Roller Shutters**

Metal roller shutters can be fitted internally for high risk premises. As with externally mounted shutters, any product should be approved to Loss Prevention Standard (LPS) 1175.

**Planning Permission**

It is possible that planning permission may be required for some types of fixed security protection. Zurich customers have encountered planning problems when attempting to install external security measures, especially where premises are in a conservation area. Whenever additional security protections such as grilles or shutters are being considered, the local planning authority should be contacted for clarification of the local planning rules.

If the building is listed, English Heritage should also be contacted prior to commencement of any work.
Summary

Theft accounts for a major proportion of insured losses and can cause subsequent business interruption, not only from any stock or contents that have been stolen but also from the damage caused to buildings in the course of the break-in. Physical security measures such as grilles and shutters offer improved levels of security, especially where there are high value contents or where the building is in an isolated position, out of usual working hours. Care should be taken when selecting the type of protection to be installed. Zurich recommends that, where possible, internal grilles or shutters are installed as these offer a higher level of protection than external grilles and are more difficult to attack.
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