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Vehicle security barriers — Part 2: Application

*Barrières de sécurité de véhicule —
Partie 2: Applications*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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IWA 14 consists of the following parts, under the general title *Vehicle security barriers*:

- *Part 1: Performance requirement, vehicle impact test method and performance rating*
- *Part 2: Application*

This corrected version of IWA 14-2:2013 incorporates editorial modifications.

Introduction

0.1 Workshop contributors

Acknowledgement is given to the following organizations that were involved in the development of this International Workshop Agreement:

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0.2 Relationship with other publications

The following documents have been used to inform the development of this part of IWA 14:

- ASTM F 2656
- CWA 16221
- PAS 69
- PAS 68

Vehicle security barriers —

Part 2: Application

1 Scope

This part of IWA 14 provides guidance for the selection, installation and use of vehicle security barriers (VSBs) and describes the process of producing operational requirements (ORs).

It also gives guidance on a design method for assessing the performance of a VSB.

2 Introduction to hostile vehicle mitigation

2.1 General

2.1.1 Vehicle-borne threats can range from the use of a vehicle for vandalism to determined attacks by adversaries (e.g. criminals and terrorists). The mobility and payload capacity of a vehicle can offer a tactical means to deliver a large explosive device and/or carry adversaries with attack tools. Hostile vehicles can be parked, manoeuvred or rammed in to or out of a site. Entry to, or exit from, a site can also involve surreptitious tampering with VSBs or their control apparatus, or the targeted placement of small explosive charges to breach the integrity of a barrier structure. Clear definition of the threat and the potential attack scenarios should be considered when deciding which methods of attack to defend against and consequently the most appropriate countermeasures.

2.1.2 The mitigation of all forms of vehicle-borne threat can be difficult while satisfying other business needs. The following should be considered as a minimum:

- a) security:
 - 1) the level of residual risk is deemed acceptable by the organization;
 - 2) attack method to be mitigated;
 - 3) countermeasures;
 - 4) response to increased threat conditions;
 - 5) enforceable stand-off distance;
- b) business needs:
 - 1) lifetime cost (training, manning levels, service, maintenance and replacement);
 - 2) traffic management;
 - 3) appearance;
 - 4) internal and external stakeholder requirements;

- 5) security risks induced by safety concerns or systems;
- c) engineering constraints:
 - 1) architectural;
 - 2) foundations;
 - 3) buried services;
 - 4) land ownership and available space;
 - 5) local authority planning restriction(s) (e.g. height/weight/noise restrictions of area of land, utilities).

2.1.3 It is important that a security operational requirement (OR) (see [Clause 12](#)) is developed in conjunction with a user requirement document (URD) and that all key stakeholders are involved from the outset.

2.1.4 The considered elements (i.e. security ORs, user requirements) can adversely influence each other. Therefore early consideration of acceptable compromises should be made, particularly with regard to the security and safety aspects of the VSBs.

2.1.5 There is likely to be a need to prevent unauthorized vehicle movement, to allow the safe, secure and timely transit of legitimate vehicles. Additionally, long-term security issues relating to system reliability and a change in threat level can also compromise the initial ORs. An unreliable VSB is unacceptable and has additional implications that may include costly compensatory measures to correct the condition. A change in threat can result in heightened security response levels and VSBs and procedures that cannot operate either safely or securely in that new environment.

NOTE See [Clause 12](#) for further information on ORs.

2.1.6 Risk assessments should be conducted for safety and security early in the project design phase of project planning and after final installation to ensure the level of risk acceptable to the site is established and maintained. These assessments should be shared with or jointly produced by the stakeholders (e.g. site owner, security and safety representatives, project manager, staff association). The early engagement with the stakeholders can facilitate the development of business cases and can help identify potential issues, associated costs and constraints.

2.1.7 Often vehicular access has to be provided through the VSB line. The vehicles should be searched or be of known authenticity before arriving at the vehicle access control point (VACP). In this instance a single or multiple access point may be provided through the stand-off barrier line, e.g. rising, swing or sliding gate barriers. Where the stand-off measure forms the site boundary or site secure perimeter, the VACP then typically becomes the first point of challenge for all vehicles.

2.1.8 Regardless of the type of active VSB installed, a secondary access control point should be considered. This is to ensure that where the VSBs fail or there is an incident at the main VACP, traffic can easily be diverted to the secondary location. This location should be able to accommodate the traffic volumes typical to the main VACP while maintaining the same level of operational security.

2.1.9 Where an entrance has more than one VSB, for example a separate entry barrier and exit barrier, then each VSB should have independent drive and control systems. This is to prevent a cascade or nodal failure as a result of one VSB developing a fault. They may share the same user interface, hydraulic circuits and electrical systems, but should be designed so that its failure does not disable all VACPs. Provision of an uninterruptable power supply (UPS) or standby generator should also be considered.

2.2 Selection of a VSB

2.2.1 The selection of a VSB is dependent on a number of factors, including but not limited to:

- a) the threat ([Clause 3](#));
- b) the assets to be protected ([Clause 4](#));
- c) the site ([Clauses 5 and 6](#));
- d) the required performance of the VSB ([Clause 7](#));
- e) the procurement strategy ([Clause 8](#));
- f) deployment and removal of the VSB ([Clause 9](#));
- g) the type of VSB required ([Clauses 10 and 11](#)).

2.2.2 The decision process for the selection of VSBs is illustrated in the flow diagrams in [Clause 12](#), which covers ORs.

3 The threat

3.1 Identify and quantify the threat

3.1.1 Review any previous terrorist, criminal or malicious incidents and consider their relevance to your site regarding the target and attack methods used.

NOTE Contact your national, regional or local security force.

3.1.2 There are five main types of vehicle-borne threat. All can be deployed with or without the use of suicide operatives.

- a) Parked vehicles – where unscreened vehicles are parked adjacent to a site, in underground parking facilities or overlooking a site.
- b) Encroachment (exploiting gaps in defences) – where a hostile vehicle is negotiated through an incomplete line of barriers or an incorrectly spaced line of barriers without the need to impact. An alternative form of encroachment attack is exploitation of an active barrier system at a vehicle access control point (VACP) by a hostile vehicle “tailgating” a legitimate vehicle.
- c) Penetrative attacks – where the front or rear of the hostile vehicle is used as a ram.
- d) Deception techniques – a “Trojan” vehicle (one whose model, livery or registration is familiar to the site), or where hostile occupants negotiating their way through by pretence or by using stolen (or cloned) access control or ID passes. Alternative scenarios include an unwitting “mule”, a driver unknowingly delivering an Improvised Explosive Device (IED) surreptitiously planted in their vehicle by an attacker, or an “insider” bringing an IED in to their own work site. Deception techniques prey on human and operational weaknesses.
- e) Duress techniques – the driver of a legitimate vehicle is forced to carry an IED or where a guard controlling a VACP is forced to allow a vehicle entry. These are perhaps the most difficult forms of vehicle borne threat to defend against.

3.1.3 Site design can also accommodate countermeasures for layered attack scenarios using one or more of the threat types given in [3.1.2 a\) to e\)](#), for instance, the use of a first hostile vehicle to create a gap by way of penetrative attack or blast which then allows a second to encroach through.

3.1.4 Potential threats to be considered:

- a) whether the vehicle is parked outside or inside the security perimeter;
- b) size of vehicle (both largest and smallest);
- c) speed and direction of approach.

3.2 Duration of deployment

3.2.1 The period for which security measures is required (design life) should be defined.

3.2.2 Assess whether the security measures are to be operated continuously or occasionally. Decide whether a permanent, semi-permanent or temporary installation is required and identify the level of protection that the security measure is required to provide. Decide how and where the system is to be controlled from, i.e. controlled locally by guard, from a central control room or through the use of automatic access control systems (AACS).

3.2.3 A permanent installation is a physical measure, which may require significant civil engineering works and is expected to remain for the life of the asset.

3.2.4 A temporary installation is a physical measure that may be deployed on the basis that it remains *in situ* for a short period of time. The extent of the remedial measures required upon removal are kept to a minimum.

3.2.5 A semi-permanent installation is defined as a hybrid installation that incorporates some transitory elements that can be retracted or removed leaving any permanent foundation or anchorage *in situ*.

3.2.6 Assess and review at regular intervals whether the security measures need to be adapted to a change in the threat.

4 Assets

4.1 Identification of the critical assets

4.1.1 The assets to be protected should be identified, i.e. machinery, infrastructure, equipment, one or more buildings, an area, public event, or crowded place.

4.1.2 If more than one asset is identified, they should be prioritized.

4.1.3 It should be determined whether there is an existing defensible security perimeter and whether there is a need to establish a temporary or permanent perimeter security scheme.

4.1.4 The physical VSB strategy may be coordinated with adjacent interested parties.

4.2 Identification of stakeholders

The contact information should be obtained for all stakeholders who may be affected by the proposed security measures. These include but are not limited to staff, deliveries, local authorities, public transport, emergency services, utility companies, highway authorities, architects, neighbours and landlords.

4.3 Consideration of collateral damage

4.3.1 The consequences of a successful attack and the likely disruption in terms of loss of life, damage, delays, perception and business and financial impact should be assessed.

4.3.2 Locations or other assets which might suffer collateral damage, short- or long-term disruption to their operations from a successful attack should be identified. For example:

- a) neighbouring buildings (e.g. government, military, residential, business, emergency services, schools, religious sites or other assets);
- b) people;
- c) major communication networks (above and below ground);
- d) control rooms;
- e) electricity, water and gas lines or storage facilities (above and below ground);
- f) underground tunnels, basements and subways;
- g) ventilation shafts;
- h) bridges;
- i) public transport infrastructure and airports.

4.3.3 Other locations/assets that might become alternative targets if the security strategy being employed at the principal asset is effective should be identified.

5 Site assessment

5.1 Review of existing security arrangements

Once the site security plans have been implemented that establish the acceptable level of security risk, a change control process should be adopted for any proposed site changes (e.g. site infrastructure, safety related, physical security related, VSB hardware and procedures) to ensure an acceptable level of risk is maintained. As part of the configuration control process, an analysis should be performed that ensures that acceptance of the proposed change does not reduce the effectiveness of the previous site security plans.

5.2 Site survey

5.2.1 All possible approach routes along which a hostile vehicle could challenge a VSB or secure perimeter should be determined. This includes all footpaths, footways, cycle paths, open spaces and gaps and also the likelihood of hostile vehicles travelling against the expected direction of traffic. The location and usability of drop kerbs/curbs and other adaptations for use by disabled persons should be considered.

5.2.2 Existing features should be identified that could be integrated into the vehicle mitigation scheme, such as resilient street furniture and traffic management measures. Consideration should be given to the effect on security of possible future changes to these features.

5.2.3 Any environmental conditions that might arise throughout the year that may be particular to the site should be identified, such as flooding, leaf mulch, frost, snow, ice, high wind speeds, sand storms, or extremes of temperature (see [7.5.4](#)).

5.2.4 The existing road surface, kerbs and verges, gradients, camber or crossfall, at and in advance of, any proposed VSB location should be considered.

5.2.5 Any existing, or proposed road improvements or other works in the immediate area should be confirmed through the local planning office and highways department.

5.2.6 The need for a wider area traffic management plan should be reviewed and the impact of a perimeter security scheme on existing traffic movements should be considered.

5.2.7 If the potential threat exceeds the current security arrangements and any currently deployed VSBs' capability, additional protective measures should be considered.

5.2.8 The presence and location of all underground and overground services and utilities should be considered.

5.3 Civil works

5.3.1 Variations between VSB performance under vehicle impact test conditions and site conditions.

5.3.1.1 The performance of a VSB is likely to be affected by the site conditions.

5.3.1.2 When assessing the suitability of a VSB at a particular site, the performance of a VSB under site conditions should be assessed.

5.3.1.3 For example, the following site conditions could affect the performance of a VSB:

- urban areas, where utilities are frequently present;
- low temperature locations, i.e. frequently below $-10\text{ }^{\circ}\text{C}$;
- high temperature locations, i.e. frequently above $40\text{ }^{\circ}\text{C}$;
- desert environments, where soil conditions are significantly different;
- wetland environments, where soil conditions are significantly different.

NOTE A suitably qualified engineer should determine how the VSB could be affected by non-standard conditions and should assess whether the VSB is fit for purpose under site conditions. The engineer should have experience in geotextiles, structural and mechanical work.

5.3.1.4 A process that should be followed to minimize the likelihood of performance variation is shown in [Figure 1](#).

5.3.1.5 If a VSB is being evaluated for use at a specific site it could be beneficial to test the VSB in a site-specific construction.

NOTE A suitably qualified and experienced engineer could then evaluate the test result and adapt the installation for the specific site. NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features", section 2.2.1, contains information about soil varieties.

5.3.1.6 It is known that varying the type of foundation (rigid/non-rigid) a VSB is installed in can affect the performance of the VSB. Further testing might be required if the tested conditions differ from the site conditions.

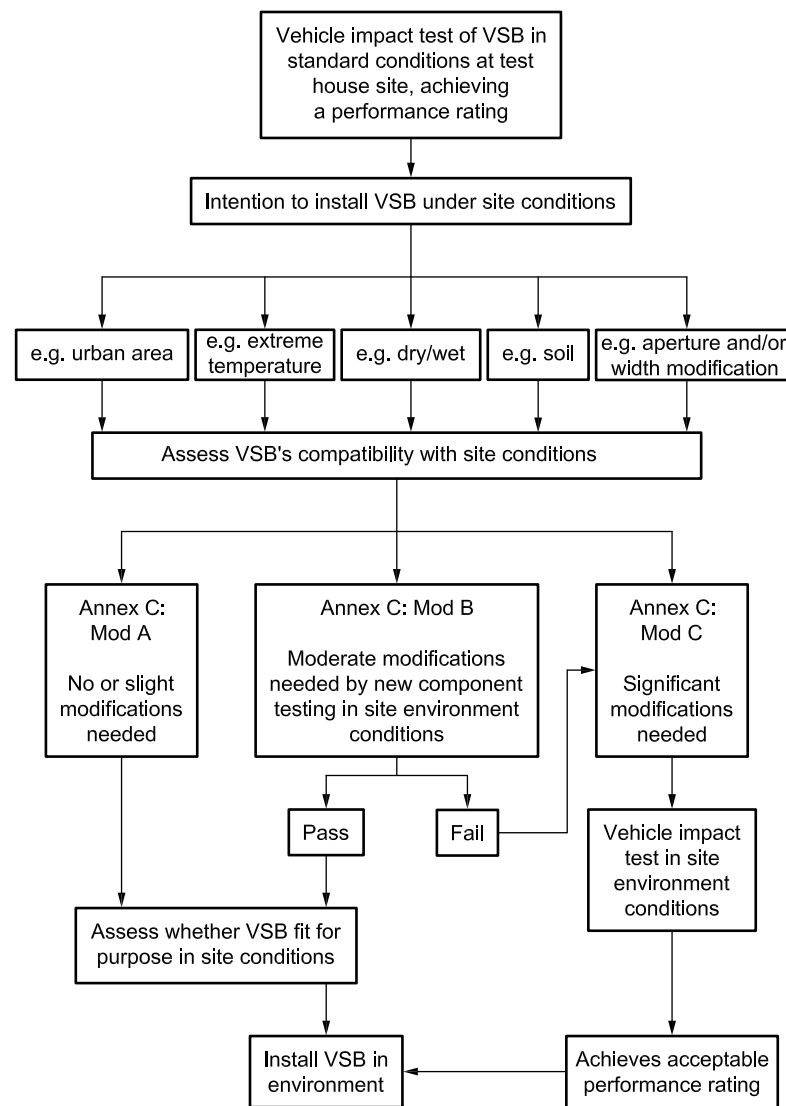


Figure 1 — Process for assessing a VSB for use under site conditions (informative)

5.3.2 Ground types

The ground should be assessed for its suitability for fixing to and supporting the selected VSBs.

NOTE This should be assessed by a suitably qualified and experienced civil/structural engineer and appropriate preparatory or remedial measures taken to ensure suitability. The engineer should have experience in structural and mechanical work.

5.3.3 Foundations

5.3.3.1 The depth required for foundations as well as the supporting ducting infrastructure for foul water drainage, sump pumps, soak aways, power and signal cables and contaminant (oil) collection should be assessed.

5.3.3.2 The ability of the concrete mix to flow in and around foundation steel (sections and reinforcement) should be considered to minimize voids and aggregate segregation.

5.3.3.3 In many urban locations underground services tend to be very close to the surface and often pass through gateways that are to be protected. In such locations, consideration should be given to surface mounted products, shallow foundations or those with foundations designed to accommodate underground services.

5.3.3.4 VSBs typically require a stable foundation. Consideration should be given to the suitability of any foundation to provide adequate resistance to the forces applied.

5.3.3.5 A VSB may be tested in a rigid foundation and/or a non-rigid foundation. When selecting a VSB, the foundation for which application it is designed should be taken into account. Where a VSB has been tested in one type of foundation but its application is considered in a different foundation, an engineering assessment should be made as to whether the VSB appropriate and will perform as required.

5.3.3.6 Some VSB systems need to be mechanically secured to the foundation or suitably robust by way of using dowels or bolts. Rebating or trenching might be enough by itself or may be combined with additional mechanical fixtures to add strength. Other VSBs are designed to be laterally displaced and rely upon friction against the substructure to dissipate impact energy and resist movement of the VSB.

5.3.3.7 In general, the larger the force to be resisted, the greater the required size of foundation. Otherwise, there could be insufficient support to enable the VSB to achieve its design requirements and required impact performance.

5.3.3.8 Foundations are required to satisfy two principal objectives.

- a) The first objective is to provide adequate support for the VSB. This is usually achieved by the strength of the concrete, the design of the reinforcement and the overall size of the foundation, particularly with regard to its depth.
- b) The second objective is to provide adequate resistance to foundation movement/rotation. This could occur when the VSB remains intact after an impact; if it is not deformed or displaced then it does not absorb a large proportion of the impact energy. If the foundation is embedded into the subsoil, a concrete foundation is almost always necessary in order to achieve the durability and design-life requirements.

5.3.3.9 When designing a foundation, prior knowledge of the sub-surface conditions of a site is essential and this needs to be obtained by site investigations such as ground radar supported by trial pits or inspection trenches. Historic records of site services can be unreliable and desk top method of site survey is not recommended as a replacement for the physical investigation outlined above. The presence of services can limit the available construction depth, and in extreme cases re-routing of services may be the only option.

NOTE Any foundation design, including those meeting site specific requirements, should be approved by a suitably qualified and experienced civil/structural engineer.

5.3.4 Surface mounted VSB

Friction between surface mounted, non-anchored VSBs, and the supporting surface is key to achieving the performance of the VSB under impact. This can be compromised by weather conditions, especially rain, snow or ice. The possible implications on year-round security protection need to be considered.

5.4 Traffic survey

5.4.1 Where appropriate, traffic surveys should be commissioned to identify traffic patterns and legitimate vehicle types at all proposed entry and egress points for representative periods. The peak traffic times and volumes and any special days/occasions which may create different traffic movements should also be identified.

5.4.2 The survey should consider the various categories of vehicle and their occupants that need to enter the proposed security zone legitimately, including public service vehicles, delivery vehicles, over-sized vehicles, taxis, VIPs, employees and emergency services. Non-motorized vehicles and pedestrian movements should also be included in the survey. Site design should accommodate expected and emergency vehicles as well as infrequent over-sized vehicle access. Contingency measures (e.g. movable elements of the VSB) could be used for infrequent over-sized vehicles and separate access points may be necessary to handle the volume of delivery vehicles determined by the traffic survey.

NOTE 1 Refer to [Clause 6](#) for additional site design considerations.

NOTE 2 Over-sized vehicles may include heavy-equipment, buses, multiple trailer vehicles, emergency equipment with extended wheelbase dimensions, etc.

NOTE 3 Tracked vehicles need to be included as they can put a very different load on anything in or on the road surface. Protection against this type of vehicle is not covered by this part of IWA 14.

6 Site design

6.1 Traffic management

6.1.1 The requirements for vehicle entry and exit through the security perimeter and the options for access control management should be assessed. The type and frequency of vehicles passing through the security perimeter influences the choice of VSBs.

6.1.2 The following traffic management issues should be considered:

- a) the number of entry and exit points during routine operations (including the possibility of limiting traffic to one entry and one exit point during routine operations);
- b) the locations of the entry and exit point(s) (same or different locations);
- c) the need for a vehicle marshalling, holding and/or search area; the provision of off-site delivery consolidation;
- d) the potential risks created by the VSB, cordon (i.e. search procedures) and traffic management scheme (e.g. those with legitimate access becoming at risk from accident or attack if delayed at the perimeter);
- e) the arrangements needed for vehicles that are not to be permitted entry (e.g. off-site parking or drop-off areas);
- f) the need for rejection routes or lanes;

NOTE This is to avoid the need to open VSBs to grant entry and exit to errant vehicles for the purpose of turning around.

- g) the identification of vehicles that require access to the asset and management of their attendance/arrival, and the segregation of staff, VIPs and visitors;
- h) speed management/reduction features necessary to enhance safety and security;
- i) warning signs/lights/road markings needed to indicate the presence and status of the VSB;
- j) distance needed between warning signs and the VSBs;
- k) provision of safety and security lighting;
- l) maintenance of sightlines for guard force and road users;

NOTE Ancillary equipment, e.g. hydraulic cabinets, could affect sightlines.

- m) reaction time needed for emergency operation of the VSB;
- n) prevention of “tailgating” vehicles;
- o) traffic types and volumes;
- p) the separation of pedestrian and vehicular traffic and the distance of pedestrian crossing points from VACPs;
- q) contingency measures (e.g. for VSB maintenance/failure) to provide the same or greater resistance to attacks by the threat applicable to the site;
- r) maintenance of access for business critical vehicle movements at all times;
- s) maintenance of access in a timely manner for the emergency services at all times.

6.1.3 Based upon the threat applicable to the site, proposed vehicle access control measures and procedures should be analysed to determine if and how they might be compromised by attack scenarios.

6.2 Aesthetics

6.2.1 The appearance and location (e.g. close to a public highway) of the VSB and any associated security devices may be subject to planning, building and highway regulations.

6.2.2 It is advisable to consult with the local planning authority at an early stage of the design and procurement process, to gain insight on the acceptability of the project and to identify what documentation needs to be submitted for approval. This aids the planning process.

6.2.3 The visual impact, including layout, construction and appearance, of some VSBs may deter an attacker, whereas others may appear less robust despite performing well.

6.2.4 Consider the shape and colour of the VSB and the need for locating signage close to the VSB to signal its presence from a road user’s perspective with the aim of reducing the likelihood of accidental collisions.

7 VSB performance

7.1 Impact performance

7.1.1 General

7.1.1.1 The performance of a VSB that meets the requirements of IWA 14-1 is assessed against:

- a) vehicle type;
- b) vehicle speed (see [7.3](#));
- c) impact angle (see [7.4](#)).

7.1.1.2 The performance of a VSB that meets the requirements of IWA 14-1 is assessed for:

- a) its ability to:
 - 1) resist/restrain/deflect the test vehicle from advancing beyond the VSB; and/or
 - 2) immobilize the test vehicle by trapping it; and/or

- 3) immobilize the test vehicle by preventing it progressing using its own engine power after the impact;

NOTE If a test vehicle is immobilized, it is prevented from continuing on its course. This can be through the VSB blocking its route [see 2)] or through damage to the test vehicle preventing it from operating [see 3)].

- b) vehicle penetration distance (m):

- 1) dynamic (m); and
- 2) static (m).

7.1.1.3 Vehicle impact tests are dependent on the characteristics of the test vehicle. A VSB should be tested with a test vehicle similar to the threat vehicle being considered.

NOTE If there are differences between the tested vehicle and threat vehicle, it may be necessary to consult a suitably qualified and experienced structural/mechanical engineer to assess the VSBs capability to resist the threat vehicle.

7.2 Vehicle speed

7.2.1 General

7.2.1.1 IWA 14-1 tests the performance of a VSB against an impact from a vehicle travelling at a specified speed. Caution should be exercised when specifying a VSB. For example, it could be assumed that a rising arm barrier impact tested with a truck can stop all vehicle types up to that mass and speed level, but the rising arm barrier design might allow a smaller vehicle, such as a car, to pass under the rising arm barrier.

7.2.1.2 Vehicle speed is an important factor in determining the kinetic energy of a moving vehicle at the point of impact. Physical characteristics of the VSB and threat vehicle as well as the vehicle dynamics and the geometry of the roadway should be taken into consideration when selecting a VSB. A positive determination should be made if any other vehicle types within the region (e.g. national, continental or global) could defeat the VSB.

7.2.1.3 A range of speed reduction features (see 7.2.4) are available and should be considered where appropriate while taking account of any access that may be required for emergency service vehicles. Design and implementation of any speed reduction features should take into account access that may be required for emergency service vehicles.

7.2.2 Vehicle dynamics assessment

A vehicle dynamics assessment (VDA) should be undertaken at each specific site/location in order to determine the impact speed for the identified threat vehicles such that suitable VSBs can be installed.

7.2.3 Road layout

There is the potential to limit the approach speed of the vehicle, e.g. through changing the approach road layout to induce the driver to slow to an appropriate speed or risk losing control of the vehicle. However, precautions need to be taken to provide adequate warning to an errant motorist.

7.2.4 Speed reduction features

Speed reduction features (e.g. chicanes, serpentine) should be constructed from impact resistant materials. One element of the feature could be removable or retractable to enable over-sized and emergency vehicles' entry if alternate access arrangements are not available.

7.3 Impact angle

The impact testing of a VSB can be undertaken at a range of specified impact angles. It is therefore important that when a VSB is identified, the impact angle is taken into account, for the specific location and only VSBs that have met the requirement of IWA 14-1 at that impact angle are installed.

The possibility of the vehicle being redirected rather than stopped should be considered.

7.4 Vehicle penetration distance and major debris distance/coordinates

7.4.1 Vehicle penetration distance

Some physical perimeter security schemes allow for vehicle penetration a certain distance beyond the VSB datum line. Subsequently, several VSBs are constructed to deform upon impact to allow hostile vehicle penetration and therefore more gradual dissipation of impact energy. Vehicle penetration distance is recorded for product tests undertaken in accordance with IWA 14-1.

NOTE The term “vehicle penetration distance” is defined in IWA 14-1:2013, 3.6.1.

7.4.2 Major debris distance/coordinates

Some physical perimeter security schemes allow for major debris dispersal beyond the VSB datum line. Subsequently, several VSB designs allow for major debris dispersal. It is a requirement of IWA 14-1 test method to record (as an observation) the major debris distance post-impact.

This aspect of the impact between the vehicle and the barrier might be considered relevant when allowing for a vehicle component breaching a building or, for example, part of its load passing into a sensitive area.

NOTE The term “major debris” is defined in IWA 14-1:2013, 3.6.2, “major debris distance” in IWA 14-1:2013, 3.6.3 and “major debris coordinates” in IWA 14-1:2013, 3.6.4.

7.4.3 Standoff distance

When considering the deployment of a VSB, the standoff distance from the VSB to the asset should be taken into account. IWA 14-1 does not give a pass/fail criteria for the vehicle penetration distance or the major debris distance/coordinates but the data obtained is relevant when determining the suitability of a VSB for a specific location.

7.5 Operational performance

7.5.1 Vehicle access control

7.5.1.1 Vehicle access control measures should be identified:

- a) manual – no control system required; physical operation by guard for all movements;
- b) semi automatic – opened or closed by guard using push button control and/or closing automatically via detection loops or similar;
- c) fully automatic – opening by an access control system, closing automatically via detection loops or similar;
- d) prevention of “tailgating” – e.g. by quick acting VSBs or by a second set of VSBs located past the first set of VSBs at a distance that gives response measures enough time to close the second set;
- e) remote control override with emergency close/reset;
- f) VSB working with other equipment – rising arm barriers or gates;

- g) security of control unit;
- h) consider how the VSB is to operate in the event of a power or system failure.

7.5.1.2 The ability for an attacker to covertly defeat inductive detection loops to gain access (e.g. by sliding a metal plate over free exit induction loops or activate any free exit detection system) should be considered.

7.5.1.3 Maintenance, operation and removal costs in conjunction with the development of life cycle costs of both permanent and temporary physical perimeter security schemes should be considered.

7.5.2 Speed of legitimate access

When considering the design of a VACP note that most VSBs are only effective at stopping a vehicle when closed. The type of VSB, speed of operation, system duty rating, traffic volumes, mode of operation, safety systems, driver and guard force attentiveness and system reliability can all compromise the effectiveness of the VSBs in stopping a hostile vehicle.

7.5.3 Power requirement

How a VSB system functions in the event of a power failure should be identified. The following information should be obtained to develop an informed specification or policy:

- a) whether the position of the VSB, upon primary power loss, is acceptable to establish and maintain risk at an acceptable level;
- b) whether the position of a VSB, given a power failure to the VSB system, varies between specific VSB systems;

An uninterruptible power (UPS)/generator backup power system is necessary, if immediate back-up power is required to establish and maintain security to an acceptable level. The indication of backup power start-up should be sent to the site security force (or an appropriate monitoring station) in both an audible and visual manner (e.g. by phones, intercom or AACCS).

- c) whether the power supply can be from two physically diverse and stable routes (the safety implications of the VSB position/movement given a primary loss of electrical power to the VSB system);
- d) VSB position when switched between power supplies;

The VSB should not change position when switched from: primary power to no power (when no UPS/generator back-up is used); primary power to UPS/generator back-up; from UPS/generator back-up to primary power; or from no power to primary power.

- e) provision for surge protection for electrically powered security equipment to protect against lightning strikes;
- f) how the power failure and source of failure is indicated and if the indication is acceptable;

NOTE Typically the indication goes to a guard location and emits both audible and visual signals. For high security sites the indication may go to a primary and secondary alarm station.

- g) if after a primary power failure, the manual operation of the VSB system can be accomplished in such a manner that security is maintained at an acceptable level;
- h) if alternative security measures have to be applied after primary loss of power to the VSB system and identify if the time required to implement them maintains risk to the acceptable level.