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## Code of Practice for Closed Circuit Television Systems

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**UNCONTROLLED WHEN PRINTED**

## CHANGE HISTORY

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1	06/07	G Rendall	First issue of revised Approval Scheme document.

## Contents

Bibliography.....	4
1 Scope.....	5
2 The Company.....	8
3 Planning and Surveying for systems.....	9
3.1 Survey (General).....	9
3.2 System Survey and Design.....	10
3.3 Equipment Selection and Installation.....	11
4 Data Protection.....	14
5 Specification.....	14
6 Control, Viewing and Recording.....	16
7 Power Supplies.....	17
8 Uninterruptible Power Supply (where used).....	17
9 Installation of systems.....	17
10 Commissioning of systems.....	18
11 Handover of system to customer.....	19
11.1 General.....	19
11.2 Documentation.....	19
12 Service and Maintenance.....	20
12.1 General.....	20
12.2 Preventative Maintenance.....	20
13 Service and Maintenance – emergency service.....	22
14 Records.....	22
14.1 General.....	22
14.2 System Equipment Record.....	22
14.3 Faults Record.....	22
14.4 Record of each visit.....	22
14.5 Emergency Service Record.....	23
14.6 Record of temporary disconnection.....	23
15 Change of Customer.....	23
15.1 Notification.....	23
15.2 Re-commissioning.....	23
15.3 Re-certification.....	23

## Bibliography

BS EN 60529:1992      Specification for degrees of protection provided by enclosures (IP code)

BS EN 50132 – 7 Alarm systems – CCTV systems for use in security applications –part 7  
Application guidelines

Construction (Design and Management) Regulations 2006 which will come into force in April 2007

BS 5979  
Code of Practice for remote centres receiving signals from security systems

BS EN ISO 11064-1 & -2  
Ergonomic design of control centres - Principles for the design of control centres & principles of control suite arrangement

# 1 Scope

The following Code of Practice has been drawn up to assist registered and applicant companies to apply the appropriate standards of work and conduct required for recognition under the SSAIB Approval Scheme for installers of Closed Circuit Television Systems. Adherence to this Code of Practice will contribute to a professional approach to the design and installation of Closed Circuit Television Systems where there is no particular customer's specification or a customer's requirement for full compliance with European Standards, i.e. BS EN 50132.

Before an applicant company can be registered as Approved by SSAIB under this scheme it will be required to satisfy the SSAIB that it is financially sound, operating from suitable premises, and able to meet all of its obligations to its customers and to SSAIB. It will be required to have suitably competent and qualified personnel, and suitable premises and equipment, offer a 24 hour service for emergency maintenance calls, and in all other respects satisfy the criteria set out in the SSAIB Criteria for Registration for Security Systems.

This SSAIB Approval Scheme is not a UKAS accredited Certification scheme and should not be described as such in an approved company's literature. Approved companies may use the basic SSAIB mark but may not use any SSAIB logo which includes the UKAS "Crown and tick" symbol (other than where the company holds certification for another UKAS accredited scheme).

**Approved companies must not display or present marks in a misleading manner.**

Systems designed to detect intrusion and transmit images to a remote monitoring facility and summon a Police response and their monitoring facilities should comply with the current issue of BS8418: *Installation and remote monitoring of detector activated CCTV systems — Code of practice.*

This Code of Practice is supplementary to the SSAIB Rules and Criteria documents as published from time to time.

***The following definitions apply:***

***Auto Iris***

An automatic method of varying the size of a lens aperture in response to changes in reflected light level from a scene. There are two methods used, video drive (with electronic processing in the lens) and Direct Drive (or DC) where the electronics processing is in the camera.

***CCTV Camera***

A unit containing an imaging device producing a video signal.

***CCTV Installation***

A CCTV system or associated group of systems, together with all necessary hardware, auxiliary lighting, etc.

***Closed Circuit Television System***

A system of Closed Circuit Television (CCTV) cameras, lenses, display devices, controllers, video-recording devices, transmission methods and other ancillary equipment designed to meet the surveillance requirements of a customer.

***Commissioning***

The completion of installation and final testing of a system prior to its handover.

***Company***

An organisation prepared to enter into a contract for the design, provision, installation and/or maintenance of a Closed Circuit Television System.

### ***Composite Video Signal***

An electrical signal conveying all of the elements of the image such as synchronisation pulse, luminance (monochrome intensity) and if it is a colour signal, chrominance (the colour component).

### ***Customer***

A person or organisation utilising any or all of the services of a company for the design, installation and/or maintenance of a Closed Circuit Television System.

### ***Environmental Housings***

Equipment enclosures and associated accessories, such as heaters, washers and wipers, to meet specified environmental conditions. Usually given an IP rating.

### ***External Synchronization***

A means for ensuring that all equipment in a CCTV system is synchronised to one source.

### ***Fixed Focal Length Lens***

A lens with a pre-determined fixed focal length, normally having a focus control and iris adjustment.

### ***Focal Length***

The distance between the optical centre of a lens and the principal convergent focal point. Focal length is a measurement quoted in mm which determines the viewing angle of the lens. The smaller the number in mm the wider the viewing angle and visa versa.

### ***Focus Control***

A means for adjustment of a lens to allow objects at various distances from a camera lens to be sharply focussed on the imaging device.

### ***Identity Card***

A means of identification to be carried by authorised staff.

### ***Incident Light Level***

The average light level falling upon an area under surveillance, measured in lux.

### ***Iris***

A means for controlling the size of a lens aperture and therefore the amount of light passing through a lens.

### ***Lens***

An optical device used to focus the image of a desired scene onto the imaging device in a CCTV camera.

### ***Manual Iris***

A manual method of varying the size of a lens aperture.

### ***Multiplexed Video Recording (Time Division Multiplexing)***

The sequential recording of more than one video signal on to a single recording medium to enable multiple camera signals to be recorded. It is NOT simultaneous recording. Now often a part of a digital video recorder but older systems may have a discrete multiplexer unit.

### ***Operational Requirement (OR)***

A preliminary document which establishes the client's requirements in terms of functionality.

*(Note: This is not the system specification, but is intended to assist the designer to arrive at a system specification which meets the client's requirements).*

***Pan and Tilt Unit***

A motorized unit enabling the remote positioning of the horizontal and vertical angle of a camera.

***Pinhole Lens***

A fixed focal length lens, for viewing through a very small aperture, for discreet/covert surveillance purposes. The lens often has no focusing control but often offers iris adjustment.

***Reflected Light Level***

The amount of light reflected from the scene, measured in lux.

***Rotakin***

A commercially available test target for the verification of CCTV system performance, and endorsed by the Home Office Scientific Development Branch.

***Supervised Premises***

That part of a building or area which is under surveillance by a Closed Circuit Television System.

***Surface Reflectance***

The proportion of the incident light that is reflected towards the camera, normally expressed as a percentage (of the incident light level).

***Telemetry Control***

Facility for remotely controlling features including pan and tilt positions and lens functions, speed of movement etc.

***Text Generator***

A device enabling information to be superimposed on a picture being displayed.

***Time Lapse Video Recording***

The recording of individual fields/frames of video at pre-determined and controlled intervals to extend the recording time of the recording medium (gives a stop motion effect).

***Vari-focal Lens***

A lens in which the focal length can be set within a pre-defined range, but the image cannot remain in focus. The lens has a focal length control, focus control and iris adjustment.

***Video Display***

A device for converting an electrical video signal into an image for viewing. Various technologies exist such as cathode ray tube (CRT), liquid crystal display (LCD), plasma and video projectors.

***Video Distribution Amplifier***

A device which provides multiple ( often 2, 3, 4, or 5) isolated outputs from a single video signal input.

***Video Equalization/Corrector***

A device which can correct for various frequency losses in the transmission of a video signal, the losses typically being due to long distance transmission.

***Video Line Amplifier***

A device providing amplification of the video signal along a transmission line.

***Video Motion Detector***

A detection technology which can respond to pre-determined changes in the video, and generate an alarm condition and/or initiate some other function within the system.

### ***Video Printer***

A device for converting a video signal to a hard copy print-out can be monochrome or colour.

### ***Video Switcher***

A device for switching more than one camera to one or more video display manually, automatically or upon receipt of an alarm condition.

### ***Zoom Lens***

A lens in which the focal length can be varied within a pre-defined range and the image remains in focus. The lens has a zoom ratio control, focus control and iris adjustment.

### ***Zoom tracking***

When set correctly, it enables an object to remain in focus during the whole zoom range.

For the purposes of this Code of Practice, the following abbreviations apply:

DPA	Data Protection Act (1998)
DVR	Digital video recorder
HOSDB (formerly PSDB)	Home Office Scientific Development Branch
ICO	Information Commissioners Office
NVR	Network video recorder
OR	Operational Requirement
PSDB	Police Scientific Development Branch
UPS	Uninterruptible power supply
UTP	Unshielded twisted pair
VCR	Video cassette recorder

## **2 The Company**

The company should have adequate and competent CCTV surveying, design, installation, commissioning and maintenance expertise, and its employees should be competent e.g. by accredited training, and they should be equipped with the necessary tools, equipment and instruments to enable them to do their work effectively.

Employees should be issued with an identity card incorporating the following information:

- a) the name, address and telephone number of the organization;
- b) the name of the employee, employee number and employee's signature;
- c) the expiry date of the card (not more than three years from the date of issue);
- d) a current photograph of the employee.

Employees should be instructed to carry their identity cards while on duty.

Expired or un-needed identity cards should be formally withdrawn from employees on renewing their cards or leaving the organization, and destroyed in a secure manner which should preclude any further use of the withdrawn card.

A record of identity cards issued should be maintained. This record should also indicate the status and location of withdrawn cards, e.g. whether they have been destroyed or lost, or where they are held by the employee/organization.

If providing maintenance services, the company should be able to provide a 24 hour service, together with adequate spares, equipment, communications and transport, as necessary to fulfil this requirement. In addition, the company should respond to a request for emergency service within the period agreed with its customers.



The SSAIB requires that the company complies with all relevant SSAIB Criteria and Rules as published from time to time. The relevant criteria document for providers of Closed Circuit Television Systems is the Criteria for Registration - Design, Installation, Maintenance and Monitoring of Electronic Security Systems.

Companies should be aware of their obligations under current Data Protection Legislation and all other relevant legislation and must comply with these at all times.

The company shall familiarise itself with its legal obligations under the Working at Height Regulations, and ensure that adequate access equipment is available and used where working from ladders is not adequately safe. Further guidance is available from

The Health and Safety Executive,

Tel: 0845 345 0055

[www.hse.gov.uk/falls/ladders.htm](http://www.hse.gov.uk/falls/ladders.htm)

The design, installation, commissioning and maintenance personnel employed by the company should be competent and equipped to do the work expected of them as defined by the company's management. The following should be considered:

- Reliable and secure transport
- Means of communication
- Access equipment maintained in safe condition and operated by trained staff
- Test measuring equipment as appropriate
- An appropriate selection of hand tools, including BNC crimp tool and crimps in good and safe repair
- Electric drill (Rechargeable or 110 Volt) and/or 110 Volt isolating transformer plus 110Volt. extension lead
- Specialist electronic test equipment appropriate to the equipment being installed, but as a minimum a video level meter (an oscilloscope is also recommended but not essential for installation)
- Suitable personal protective equipment including goggles, safety footwear, head protection and high visibility clothing, as appropriate.
- Company procedural manuals or other equipment installation instructions as appropriate
- Service manuals and spares
- Valid Identity card

It is the employee's responsibility to ensure that all tools and equipment are kept in good working order. Management should check periodically that the equipment is being maintained and also arrange for regular checks of measuring instruments, to ensure an appropriate degree of accuracy is maintained.

The company premises should have an adequate level of physical security at the perimeter and an intruder alarm system- preferably with remote signalling to an ARC. Documents should be stored in a lockable filing cabinet with restricted access.

## **3 Planning and Surveying for systems**

### **3.1 Survey (General)**

The importance of logical and well reasoned approach to planning in both the surveying and the design is essential. Appropriate systems design will have a significant bearing on the performance and reliability of the final CCTV system. It is now a requirement of the Construction (Design and Management) Regulations that the designer shall carry out the design

of an installation to eliminate or reduce risks. This includes the risks that may occur during installation, use, and maintenance.

### 3.2 System Survey and Design

There should be a written specification of the system to be installed, incorporating the criteria defined in the OR which should be agreed between the company and the customer and any appropriate third parties such as insurers or other specifiers. The document should be signed by all interested parties. At all times the confidentiality of the information should be recognised and maintained. If the specification is designed by, or to the requirements of the client or a third party, then this should be clearly recorded in the documentation.

If the specification is to be used by the customer for insurance purposes, it is strongly recommended that the customer obtains agreement in writing from the insurance company that they are happy with the specification/OR, before work commences on the installation.

Any changes to the specification, or the method of operation of the system after agreement of the contract should be agreed in writing, by all interested parties and re-confirmed on service visits.

The specification for a particular CCTV installation will depend on several issues including:

- The risks
- Type of surveillance required e.g. daytime only or 24/7
- The level of detail to be displayed and/or recorded e.g. is facial recognition required.
- Transmission systems and media
- Level of surveillance
- Is vandalism likely to be a problem e.g. equipment damage?
- Type and usage of the area/building to be observed
- Lighting issues e.g. sunlight/low light/no light.
- Responsibility for installation of any additional lighting required
- Maintenance of the system
- Safety of maintenance staff
- The required response.

Bearing this in mind, several parties may need to be consulted at the initial survey/design stage including:

- The client or end user
- Insurers (if applicable)
- Police (if applicable)
- Specialist security consultants (if applicable)

To establish this process, the client or end user's objectives and expectations are fundamental in designing a system that is fit for their purpose. These expectations will constitute the basis of the system's "Operational Requirement". It is recommended that all interested parties meet on site at the earliest stage of planning and design so that the requirements for surveillance can be established at this time. If this is not possible, it is likewise strongly advised that the appropriate interested parties visit site and make known their views and recommendations prior to installation commencing. It is recommended that all interested parties should retain copies of documentation and correspondence relevant to the project.

The following points should be considered when surveying and designing a system:

- The camera and lens combination proposed should give adequate performance under all intended lighting conditions.
- The environmental conditions in which a camera is to operate should be fully taken into account.
- The selected camera position allows for security and maintenance (e.g. not
  - Vulnerable to vandalism or other attack.
- Consideration should be given to camera position and performance at certain times of the day or night (e.g. low sun at dawn and dusk, bright lights at night, seasonal variations etc. that may require extended sunshields).
- The camera mounting brackets towers, poles and their fixings should be adequate to support the weight of the camera and any co-mounted hardware. The effect of wind pressure on the completed assembly should be taken into account for safety and image stability reasons.
- The lens chosen covers the area to be viewed and provides the correct level of detail specified e.g. the “Identification” or “Recognition” etc of a Rotakin or equivalent.
- The lens format is compatible with the selected camera.
- The intended size and number of monitors/displays takes into account operator viewing distance and fatigue (“monitor blindness”).
- Ensure compensation has been made for any unacceptable signal loss that may result from the transmission distance between cameras and monitors.
- The control equipment, video recorder, monitors etc. are suitably positioned to take account of the environmental conditions and ease of use.
- The control equipment takes into account any foreseeable future requirements
- The system can be easily controlled and monitored by the operator(s).

### 3.3 Equipment Selection and Installation

#### 3.3.1 Environmental Conditions

Equipment should be selected and/or installed to withstand the following air temperatures:

Internally sited equipment, 0 to 40 degrees C

Externally sited equipment, -20 to 50 degrees C

*Note: Equipment exposed to direct sunlight can exceed these temperatures and appropriate shielding, or extra cooling, may be required in such circumstances. Exterior graded equipment should be considered for use in unheated premises.*

Where equipment is exposed it should meet a minimum of IP65 or, in a particularly exposed location or tunnels, IP66 as specified in BS EN60529.

For all items of equipment to be used, the following should be taken into consideration:

- Temperature
- Humidity
- Dust and other air contamination
- Vibration
- Electrical interference
- Rigidity, taking into account high wind velocity
- Ease of safe access for installation, maintenance and service
- Convenience of operator use

### 3.3.2 Brackets and Towers

Brackets and towers should be specified to take account of the following points:

The maximum load to be carried by the bracket or tower.

The possibility of the camera assembly being used as a bird perch must be considered, especially where large birds, such as seagulls, may be present.

The effects of high wind speeds on the windage area of the equipment to be mounted on the tower or bracket.

For towers or columns, the ground conditions must be established to enable correct design of the foundation.

The height at which the equipment is to operate.

Wherever possible “tilt over” or “wind down” towers should be used so enabling all maintenance of equipment to be carried out at ground level.

Before erecting brackets and/or towers the following points should be taken into consideration and manufacturers’ specifications and recommendations should be followed:

Planning permission (where applicable the customer is responsible)

Temperature (with regard to distortion of alignment)

Rigidity (taking into, account high wind velocity)

Corrosion resistance having regard to any specific local conditions

Possibility of damage from lightning (BS EN 62305 refers).

### 3.3.3 Lenses

Lenses should be specified to take account of the following points:

The lens mount (C or CS) should match that of the camera, or an adaptor should be used.

The lens angle should be selected to give the required ‘field of view’ and image size required (Identification, Recognition etc.).

Unless lighting levels are almost constant, it is recommended that the lens has an adjustable iris control, even when using Electronic Iris.

It is recommended that lenses used on cameras subject to wide variations of light levels are fitted with an automatic iris to control the light levels reaching the sensor.

Where necessary due to extreme ranges of lighting levels, a neutral density (ND) spot filter should be incorporated.

Lenses for day and night use, shall be set up using Neutral Density filters to set the “back focus” to avoid pictures going out of focus at night. Zoom lenses shall also be set up using neutral density filters to ensure zoom tracking is achieved.

Where lighting levels are lower the use of aspherical lenses should be considered.

### 3.3.4 Cameras

Cameras should be mounted in serviceable positions, free from obstructions, and wherever possible not directly viewing bright light sources. Wired connections should, wherever possible, be concealed. Mechanical protection should be considered e.g. metal conduit or flexible conduit on movable cameras, where physical damage is a possibility.

Cameras should be specified to take account of the following points:-

Video output should be 625 line CCIR standard with colour encoding being PAL, when used in the UK, unless otherwise required by the specification..

The signal to noise ratio should be greater than 43dB, under normal conditions of operating, with the AGC control off.

The minimum sensor illumination should be stated (in Lux) to achieve a full video output.

The lens mount (e.g. C or CS) should be compatible with the required lens.

Auto iris output, either video or direct drive, as compatible with the chosen lens, should be available.

All cameras shall be clearly marked with their operating voltage.

The environmental conditions in which a camera is to operate should be taken into account when choosing the camera housing.

The camera and its support hardware should be securely mounted taking into consideration the long term effects of vibration.

Where supplementary lighting is to be used the spectral response of the camera should match that of the lighting.

Where day and night use of a camera is required, the use of colour/monochrome switching cameras is recommended.

### **3.3.5 Camera positioning equipment**

Mechanisms should be specified to take account of the following points:-

The maximum required pan and tilt rotation in degrees or if continuous rotation for pan is required.

The establishing of “no-view” sectors if required to comply with Data Protection (privacy) recommendations issued by the Office of the Information Commissioner.

The effective rotational speeds of the intended targets should be known

The required rotational speeds of pan and tilt or if proportional or variable speeds are required.

The maximum load, and the rigidity, taking into account high wind velocity.

For aesthetic reasons domes may be considered. When choosing domes the following points should be assessed:-

- The optical correctness of the dome,
- the lens moves concentrically within the dome
- the loss of light through smoked or mirrored domes
- internal reflections
- how will the dome be cleaned if externally mounted

It is recommended that in the interests of safety, extra low voltage mechanisms are considered.

Where equipment moves under normal operation (e.g. pan/tilt camera), a warning notice should be affixed adjacent to the assembly indicating the dangers of movement without warning

The manufacturer’s recommendations should be followed and consideration should be given to the method of mounting and possible requirements for safety restraining chains (or similar).

### **3.3.6 Cabling**

Where any work is required on any mains supply circuits, the requirements of BS7671 (formerly the “Requirements for Electrical Installations issued by the Institution of Electrical Engineers (now the Institution of Engineering and Technology), shall be met.

All interconnecting cables should be fixed and supported and installed to conform to good working practices.

Suitable fixings and supports can include:

**Conduit:** when metal or plastic conduit is used suitable bushes or grommets should be fixed to each end to prevent damage to the cable. Where metal conduit is cut any protective medium, such as galvanise shall be repaired. When conduit is used to carry the, cable it must terminate as close as possible to the unit to be connected.

**PVC or metal trunking:** where trunking is used to carry the cable it should terminate as close as possible to the unit to be connected.

Where conduit or trunking is used, the manufacturers recommended capacity of the containment shall be observed.

**Cable ties:** Where cable ties are used, they shall not be over-tightened because of the possible damage to the performance of coaxial cables.

**Catenary:** When overhead catenary wires with loop holders or plastic buckles are used the supporting wire should be securely attached to the fabric of the building.

**Coaxial cables:** The maximum length of cable run should not exceed the distance which equates to a loss of 6dB at 5.5MHz for the entire length or run, including switching and monitors etc. All coaxial cable shall be 75ohm characteristic impedance.

**Running cables together:** Care should be taken to keep signal cables separated from mains cables, because of the risk of induced effects. When CCTV cables are to be run within cable containment systems containing mains cables, the IEE Regulations concerning segregation should be observed.

All cables should be of the type and size appropriate to the application and should take account of transmission rate, electrical interference and voltage drop.

The Supervised premises shall be surveyed using the principals of the OR as advised by the HOSDB

## 4 Data Protection

The client should be made aware of the requirements of the Data Protection Act with regard to CCTV, in so far as they may apply to images obtained and/or rights the rights of “subject access”. Appropriate signs may be necessary to comply with the Code of Practice issued by the Information Commissioner’s Office (ICO). The applicability of the DPA to a particular CCTV system will depend upon the ownership, design and use of that system.

Where a camera can overlook private areas (e.g. private gardens, windows of dwellings etc.) it may be necessary to establish restrictions to the view or to pan and tilt mechanisms to comply the ICO Code of Practice.

The Code of Practice and further guidance is available on the website of the ICO at: [http://www.ico.gov.uk/for\\_organisations/topic\\_specific\\_guides/cctv.aspx](http://www.ico.gov.uk/for_organisations/topic_specific_guides/cctv.aspx).

## 5 Specification

A written specification should be provided for the client or end user. This should be in unambiguous text and contain the following information as a minimum (note the list is not exhaustive):

- Type of CCTV to be provided (If this is limited by the customer's choice, this fact should be recorded) e.g. monochrome, colour, resolution, recorded and or live use etc.
- The type of camera to be used at each position.

- The location of the camera, its fixing height and surveyed zone which should be unambiguously defined. An effective means of indicating these items. are drawings showing the camera positions and the surveyed zones.
- The focal length of the lens.
- The minimum and, if appropriate, maximum light levels (in lux).
- Details of supplementary lighting at times of reduced visibility so that effective operation of the system is maintained.
- The location of all supplementary lighting.
- Pan, tilt zoom and focus functions including speeds and if pre-set positioning is required for these functions.
- Other control functions, if applicable e.g. proportional variable speed control.
- Details and location of display equipment.
- Details and location of video recording devices.
- Details and location of ancillary equipment e.g. amplifiers, transmitters/receivers etc.
- Details and location of power supplies, including those for stand-by (if mains supplies are lost), if applicable.
- The type, location, detection range and angle of any detection device used for triggering purposes.
- Details of any video motion detection facility.
- Details of remote monitoring and details of transmission, if applicable.
- A statement to explain that the continuing ability of the system to meet its “Operational Requirement” is subject to agreed periodic maintenance being carried out in accordance with manufacturer’s and the installing company’s recommendations.

*Note: It is recommended that the customer/end user is encouraged to enter into a service level agreement which will cover planned routine maintenance operations as described in item 15 of the Specification. Such a service agreement should define service levels and availability of response.*

The initial specification of a system should take account of the design criteria, ease of use, the quality of equipment provided, a high standard of appearance of the installation, compatibility of the equipment and possible future extension of the system.

The specification should include a design statement based upon the client’s Operational Requirement if available.

When a system is designed for use in a new building, it is essential to involve the building’s designers with a view to producing a system which has a minimum disruptive effect on the use of the finished building.

The terms of the contract between the company and the customer should make it clear whether the equipment is purchased or leased, and should state the period of warranty. A maintenance agreement to follow immediately after the warranty period should be offered to the customer. The maintenance agreement should cover a period of at least one year.

The specification should indicate that a full commissioning test will be undertaken on completion of the installation, unless otherwise agreed.

On acceptance of the specification, the customer should sign a form of acceptance or contract to indicate that he has read the specification and understands the extent of the facilities to be provided by the system. If the CCTV is for insurance purposes then this specification should also be copied to the insurance provider.

Selection of the type of transmission medium for the video signal will depend upon several factors, including:

- Compatibility with cameras, control equipment, etc.
- Distances to be transmitted and acceptable signal loss.
- Complexity of system, etc.
- Effects of extreme weather conditions and other factors.
- Reliability of transmission.

## 6 Control, Viewing and Recording

The control equipment may be located in a control room dedicated to that purpose or part of an office area or reception area. Generally, the location should be in a secure area with access only by authorised individuals, i.e. not accessible to the general public. The control equipment design should be approached using the principles of the OR to identify the needs and the solutions.

Due regard should be taken in selecting monitors and camera switching/control to ensure ease of operation. Systems should preferably incorporate automatic switching, manual and automatic control of pan, tilt and zoom and other automatic functions with manual override facilities for operator intervention under alarm conditions.

Console arrangements should take into account the principles of ergonomic design, (ISO 11064-1 & -2) operator comfort, eye strain, ease of viewing. If these considerations are not addressed, the system may not be operated efficiently.

Monitors should be placed at normal eye level and in locations unaffected by direct sunlight or other artificial light sources and at a distance to give the desired level of detail, i.e. overview or spot monitor.

Effectiveness of the system is dependent on the operator's ability to act appropriately and quickly in response to an alarm event. To this end, no operator should have viewing responsibility for more than ten monitors. In practice, this ratio may need to be reduced, depending on the levels of activity in the areas to be viewed, and any other duties required of control room operators.

It is recommended that at least one means of video recording, incorporating a time/date generating facility be installed in each system.

Several factors may need to be considered when selecting the type and number of means of video recording to be installed. These include:

- Is event-driven real-time recording necessary?
- Use of time division multiplexers for recording or should there be full rate recording?
- Will there be a loss of recording during media change or during playback, is it critical?
- Availability of removable video medium for evidence or archive e.g. tape or hard disc
- Procedures to ensure audit trail for evidential purposes

Facilities should be provided for the archiving media so that oldest recordings are erased before the latest recordings (e.g. a rotational system) are started. Consideration should be given to the secure storage of the medium which is to be retained, for long periods, say as evidence.

Consideration should be given to the ongoing maintenance activity required to maintain the system in accordance with the operational requirement. The system should be so designed so that the loss of one receiving channel etc. has a minimal impact on security considerations.



For high risk sites, it is recommended that stocks of spare items for that particular site should be held in stock, either at the customer's location or in a bonded store of the maintenance company. This will minimise down time of parts of the system.

## 7 Power Supplies

The mains power supplied to the system should be connected by means which are unlikely to be accidentally or deliberately switched off. and in accordance with the BS 7671. Means of isolation of mains supplies should be provided in accordance with BS7671.

Metal equipment cabinets containing mains power should be earth bonded in accordance with BS7671.

Where applicable, any batteries should be fully charged at handover.

Registered firms should measure and record in the maintenance record, the actual operating voltage at devices which require a significant amount of current and ensure that the operating voltages at such devices are within the manufacturers' ratings.

It is considered good practice that each item of equipment is appropriately labelled with warning notices where the voltage supplied to or present within the equipment exceeds 30V ac or 42.4V dc.

Mains supplies to cameras, control equipment etc. should be appropriately identified at distribution boards etc. This should include as a minimum requirement, the type and rating of the protective device, cable size and location of equipment supplied.

Consideration should be given to the avoidance of multiple earth paths. For mains-powered cameras, supplies should be derived from the same phase of supply wherever possible.

## 8 Uninterruptible Power Supply (where used)

The system design shall note if one (or more) UPS is required. If it is required then the equipment to be supported by UPS shall be identified in the documentation and all items of supported equipment shall have a warning label on the mains supply cable, at the equipment end, to indicate that this is a maintained supply.

When considering the rating of the UPS it is advisable to rate it such that it will not be loaded to more than 75% of its rated output. In addition to this, consideration should be given to provision for possible future expansion of the system, where discussion with the client indicates this possibility.

The UPS should be able to support all maintained equipment for a minimum of 10 minutes, unless otherwise agreed.

Registered firms should confirm that when the incoming mains supply is disconnected, the UPS-supported equipment is operational for at least the agreed period, with all supported equipment operating at its maximum consumption. This should form a part of the commissioning tests.

## 9 Installation of systems

When the specification has been agreed the installation should proceed with the minimum of disruption to the customer. All relevant parts of the installation should conform to the current issue of BS7671 and other relevant British Standards. All personnel employed on the installation of the system should have adequate training in the use of tools and equipment, and have a sound understanding of the manufacturers' recommended installation procedures.

A major proportion of the work involved in installing a system is the installation of signalling cables and it is important that this work is carefully and neatly carried out.

The following points should be given due consideration:

Extra-low voltage and signalling cables should not be installed in trunking or ducting carrying mains cables, or parallel with mains cables, unless suitably rated, screened and segregated.

The voltage drop in extra-low voltage cables should be considered so that in worst case conditions the voltage drop does not impair the operation of any devices connected to the cables.

Signal cables should be appropriate for the distance and permissible signal loss.

Any cables underground should be suitable for that purpose and have adequate protection from mechanical damage and adverse factors such as dampness, chemical reactions, corrosion, or rodents.

Cables which pass through holes should have adequate protection by the use of tubes, glands or grommets as appropriate.

Cabling should be clearly labelled or coded at each termination point to facilitate future maintenance and servicing, and a cross-reference chart showing the relationship between cables and devices should be fixed inside the control panel.

Environmental conditions such as dampness, excessive heat, risk of corrosion, mechanical or chemical damage, should be taken into account in determining the degree of protection required for cable runs.

Cable drops from ceiling to floor should be properly supported and mechanically protected.

Before installing cables, a route plan should be decided and any holes drilled through walls as required.

Excess cable at the end of cable runs should be coiled and secured to prevent damage.

The mechanical fixing of equipment should be carried out as recommended by the manufacturer, and in accordance with the agreed specification.

Where equipment is to be fixed to the fabric of the building, this should be done in an appropriately secure and adequate manner.

Controls should be mounted within a controlled area and in a position to minimise access by unauthorised persons. Due consideration should be given to ease of use by the customer.

The mains power supplies to equipment should be arranged in accordance with the manufacturers' recommendations, taking into consideration any security of supply issues. A full functional check should be carried out before any circuits are connected to it.

The equipment should provide the facilities to enable the complete installation to conform to this Code of Practice or third party specification where applicable.

## **10 Commissioning of systems.**

The installing/commissioning company should have and use a commissioning checklist detailing the checks to be carried out when a system is commissioned prior to handover to the customer.

The system should be thoroughly checked electrically, mechanically and visually to ensure that it conforms fully to this Code of Practice and the customer's system specification before being

handed over to the customer. Installation work should be executed with an appropriate degree of skill and workmanship.

In larger systems, inspection should be carried out at frequent intervals during the installation of the system. Where practicable, commissioning and inspection should be carried out by company personnel other than those who installed the equipment. Commissioning engineers should carry out the procedures detailed on the organisation's commissioning checklist.

## 11 Handover of system to customer

### 11.1 General

When the system is ready to hand over, the customer, and any other personnel who are to operate the system, should be given a complete explanation and demonstration of the system, including entry and exit routines. A list of those present should be made and kept on file. As well as a demonstration of the system, a written set of operating instructions, a maintenance record should be supplied to the customer.

An SSAIB Certificate shall be supplied to the customer, a copy retained on file, and a copy returned to SSAIB. Systems which integrate the functions of intruder alarms and CCTV systems should be issued with an SSAIB Certificate for each element of the system.

The maintenance record should be of suitable format to record details of visits and work done by the company maintenance personnel and any alterations to the system, together with details of equipment positions. Suitable instructions should be supplied describing the method of operation of the equipment. The maintenance record should show in a prominent position the telephone numbers of the company, both for normal working hours and 24 hours service.

The customer should be asked to sign the document of acceptance and the handover check list. (These may be combined into one document). The document of acceptance should include a suitable phrase to the effect that, in signing, the customer confirms that he understands how to use the system and has accepted delivery of it.

### 11.2 Documentation

Upon completion of installation and commissioning of the CCTV system there should be a system record, which may be the 'as fitted' specification, but which should include the following:

- The name, address and telephone number of the controlled premises.
- The name, address and telephone number of the customer.
- The type and location of all equipment.
- The area to be viewed, by each camera, ideally with a captured image included.

The system record should be agreed with, and authorised by, the customer and a copy provided to the customer.

*Note 1: Some of the information required for the system record may be provided by means of a diagram of the installed system.*

*Note 2: All documentation referring to a system should be kept in secure place, access to which is restricted to authorised persons.*

## 12 Service and Maintenance

### 12.1 General

It is advisable that maintenance of the CCTV system should be carried out by the company which installed the system. However, the maintenance company should have the means, including necessary spare parts and documentation, to meet the recommendations given here.

*Note: This recommendation does not place an obligation upon customers who purchase their systems to have them maintained by the installing company. Maintenance is a matter of agreement between the customer and the installing company or a separate maintenance company.*

The preservation of security within the maintenance company is of paramount importance and steps should be taken to ensure the safe keeping of all customer's equipment and documentation relating to a particular installation/contract.

A maintenance company should ensure that adequate vetting of all employees is carried out. All employees, who visit a customer's premises, shall carry identification cards which should include a photograph and signature of the bearer, the company's name, contact details and a date of expiry (maximum of 3 years).

Each service technician employed by the maintenance company should carry a range of tools, test equipment and other equipment to enable them to perform their functions satisfactorily. Specialist tools, test equipment and plant should be available for deeper investigation if necessary.

*Note: Disconnections, for whatever reason, should be recorded on a maintenance record and authorised by the client or his representative.*

The maintenance company's organisation should be so staffed as to ensure that the recommendations of this Code of Practice can be met at all times. The following factors should be taken into consideration:

- the number of installations to be serviced;
- the complexity of the installations;
- the geographical spread of the installations in relation to the location of the maintenance company, its branches and its service personnel;
- the method of calling out service personnel outside normal office hours, where applicable.

Service personnel should be adequately trained and training should be updated whenever appropriate.

### 12.2 Preventative Maintenance

#### 12.2.1 Frequency of visits

The following recommendations apply, unless the customer has agreed an alternative schedule of works with the maintenance company.

##### **Preventative Maintenance Inspection**

As a minimum, this should include all the elements detailed in Clause 12.2.2, and the intervals should not exceed 12 months. Customers may agree a more frequent regime where appropriate.

### Supplementary Preventative Maintenance Inspection

As a minimum, this should include the supplementary items detailed in Clause 12.2.3

These supplementary inspections may be carried out at the same time as an annual visit or at less frequent intervals, dependent on the agreement between the customer and the maintenance company.

#### **12.2.2 Preventative Maintenance Inspection**

During each preventative visit, inspection of the following, with all necessary tests, and those rectifications which are practical at the time, should be carried out:

##### Control Room

- Check the picture quality of each camera and monitor. Look for signs of condensation on housing windows and limiting of picture highlights.
- Check all controllable functions for each station e.g. pan, tilt, zoom, focus, iris, speed, auto-pan, wiper, pre-sets etc.
- check camera / monitor combination selection.
- check the operation of recorder (s) i.e. record and replay.
- check the operation of special equipment such as video multiplexers, date and time generators.
- check any interfaces with alarms e.g. movement alarms, fences etc.
- check that all indications function correctly.

##### Around the supervised premises

- check that camera movement and field of view is free from obstruction, trees etc.
- check that ALL warning labels are in place (e.g. movement, voltage, LASER)
- check that indicator lamps are working.
- request that customer checks the operation of supplementary lights, including IR, at night. Leave a form and request that any faults are reported.

#### **12.2.3 Supplementary Preventative Maintenance Inspection**

During each Supplementary visit, inspection of the following, with all necessary tests, and those rectifications which are practical at the time, should be carried out:

- carry out all functional maintenance checks.
- check that external, flexible cables are properly supported and undamaged.
- examine all metalwork especially towers and brackets, for signs of corrosion and damage.
- lower towers and check cable for fraying. Grease the mechanism.
- check all glands and seals on external equipment.
- check all external and internal flexible wiring for signs of wear and fraying.
- check all fixed and flexible conduit for signs of damage.
- remove covers and housings and clean interiors where necessary.
- check the function and wear of wiper blades and washers.
- check the function of heaters.
- check the function of supplementary lighting, including IR, and photocells.
- check the integrity of all supports, including cables.

*Note: It is recommended that all filament lights/lamps should be replaced during this visit.*

Those parts of a system, or any environmental conditions found during preventative maintenance, which could reduce the effectiveness of the system should be identified on the maintenance visit record.

Routine maintenance visits to the supervised premises should be made by a representative of the company at intervals of not less than once a year. Should the company, the customer or his insurer, require more frequent maintenance, this should be clearly stated in the maintenance record and in the contract documents.

*Note: :If it is necessary to undertake routine maintenance work outside normal working hours, it is recommended that the contract between the customer and the company should state this requirement.*

Those items of inspection or rectification which are not carried out at the time of routine inspection should be completed within a period normally not exceeding 21 days, other than by alternative agreement with the customer.

## **13 Service and Maintenance – emergency service**

Where an agreement exists, the customer should be kept informed of the address and telephone number of the company's service and emergency service facilities. It is recommended that except where otherwise agreed by the customer, the company's emergency service facility should be so located and organised that under normal circumstances the company's representative should reach the supervised premises within eight hours from the notification of the fault. This recommendation need not apply to other than mainland installations. Whenever possible, the customer should be informed of any likely delay when a fault is notified.

## **14 Records**

### **14.1 General**

The company should establish and maintain a system of records relating to each of its systems. The records should be securely protected from unauthorised access and/or destruction by fire, water or smoke. The records listed below may be integrated within a paper-based or computerised system.

### **14.2 System Equipment Record**

The name and address of the customer and the current position and type of each device and other equipment should be recorded. A code or system of abbreviations may be used. The information included in this record should be available to the company's representative before every maintenance visit.

### **14.3 Faults Record**

For each supervised premises, there should be a record of every call reported, the fault as reported, the visit date, together with details of the action taken and, if possible, of the cause. This information should be kept for at least two years after the event to which it refers.

### **14.4 Record of each visit**

There should be a separate record of each maintenance visit, which should include the date and, if necessary any items on which it was impracticable to carry out inspection or maintenance on that visit. The action to complete such items and the date of completion should be agreed with the client and recorded.

The record sheet should carry a clause to the effect that any work carried out on the system is at the request of the client. The record should be signed by the company's representative and should be kept for at least two years after the visit to which it refers.

#### **14.5 Emergency Service Record**

There should be a record of the date and time of receipt of every emergency call together with the date and time of completion of the necessary action. All relevant documentation and equipment should be kept for at least two years after the event.

#### **14.6 Record of temporary disconnection**

For each supervised premises there should be a record of any temporary disconnection of the system or any part of it. This should show every device or other equipment which is not in action at any time. The reason for the disconnection and the date of the reconnection should be given. A signed authorisation for each disconnection should be obtained from the customer or his representative. This authorisation should be kept for at least three months after reconnection.

The company should have sufficient resources and expertise to identify all forms of breakdown and to implement any changes necessary to correct a problem without undue delay.

### **15 Change of Customer**

#### **15.1 Notification**

When the company becomes aware of a change of customer, by virtue of change of occupier of a supervised premises, a letter should be sent advising the prospective customer of the need to re-survey the property to ensure that the installed system accords with the needs of the new occupier.

#### **15.2 Re-commissioning**

Following this, a service visit re-commissioning the system should be completed and documented for the new customer.

#### **15.3 Re-certification**

Following this, a new SSAIB Certificate of Conformity should be issued and supplied to the customer, a copy retained on file, and a copy returned to SSAIB in accordance with SSAIB Rules and Criteria.