

Closed Circuit Television (CCTV)

A Brief Guide for Business Users



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Introduction

I**N RECENT** years CCTV has proven to be an effective deterrent and means of detection in a wide spectrum of environments. The use of monitored CCTV can also be a very effective means of monitoring an area and managing its security. Most importantly, CCTV can assist in enhancing staff or public safety and provide an effective, rapid, real time method for tracking offenders across any given site or through premises.

The use of CCTV by local authorities, businesses, retail outlets and licensed premises is a common intervention aimed at reducing the anonymity of patrons and users of a site and providing a visual deterrent to antisocial behaviour, crime and disorder. However, there is a vast range in the quality of equipment used and the manner in which systems are set up that can have a drastic impact upon the quality of evidence gathered and the deterrent effect it provides. Consequently, I am providing some broad advice regarding CCTV, which should assist anyone wishing to commission such a system.

Quality of Evidence

To clarify some of the terms used, with regard to CCTV evidence and to highlight the need for specific qualities of evidence I provide the following advice:

Monitor



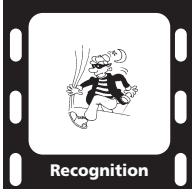
- An observer can observe the number, direction and speed of movement of people whose presence is known to them. Basically this is only really effective at monitoring crowd behaviour or detecting intrusion into a controlled area.
- Such images have limited evidential value.
- Subjects should fill no less than 5% of the screen.

Detect



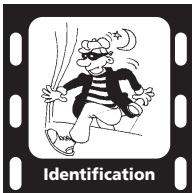
- This would support witnesses to an offence and confirm some person did some action. These images would not be sufficient to recognise or identify the offender.
- Such images would be of value in Court but only with regards to describing the circumstances and commission of the offence.
- Subjects should fill no less than 10% of the screen. This really is the minimum and there is a balance to be considered between the size of the area covered and size of subject's image.

Recognition



- Viewers can say with a high degree of certainty whether or not the individual shown is the same as someone they have seen before.
- This would be of use in Court to confirm the identity of an offender but only as corroboration to other forms of evidence such as witnesses or forensics.
- Subject should fill no less than 50% of the screen. Basically the height of the subject fills half the height of the screen.

Identification



- Picture quality and detail should be sufficient to enable the identity of a subject to be established beyond reasonable doubt.
- This is the standard of evidence required for a prosecution that relies entirely on CCTV footage.
- Subjects should be no less than 120% of the screen. Basically the head and torso of the subject are the predominant image on the recording and fill the screen.

Entry / Exit Cameras

One of the most important cameras on your system will be the entry / exit point cameras. These should have only one real purpose and this is to capture identification evidence of any person entering / exiting your premises. There is little point in having thousands of pounds worth of equipment installed that can show an offence take place but is unable to identify who was the offender. You would be surprised as to how many systems the

police view that do not conform to this very simple but vitally important principle.

You should be aware of the distinction between identification evidence gathered as a person enters or leaves a premise. This is especially pertinent to businesses such as pubs and larger shops that may have patrons on site for some time before an offence is committed. This is because the appearance of a person entering your premises may be markedly different to when they leave following an incident. For example: removal of a jacket and cap worn on entry immediately changes the description of an offender leading to confusion when trying to locate them on the recorded image. This is made more difficult in view of the time that may have elapsed between the offender entering the premises and then the incident occurring. This is especially true of busy pubs or clubs.

Offenders are usually inclined to leave any premises upon which they have committed an offence soon after its commission. Consequently it is far easier to locate the offender on the recording medium following an incident if exit image capture is used.

Our current recommendations are for the use of exit image capture cameras where possible. However, it is accepted that sometimes the physical layout of the entry / exit point will dictate that an entry camera is used.

Commissioning a CCTV System

It is a mistake to approach a CCTV installer from the point of requesting that they fit a camera to a specific point that looks as if it would obtain good evidence. If they then do exactly what you say and the result is poor, contractually they have still done exactly what was asked of them. Consequently you have little grounds to

have them come back and sort out such problems as part of the initial installation process. The result can be that the system remains in place but is not as effective as you required or there is additional expense involved in making post installation alterations.

The following advice is extremely important and should be the way in which you approach the installer. Any CCTV system should have a very clear purpose and set of reasons for its installation to fully address identified objectives. Your first step, before even approaching a CCTV installer, should be to make some notes under the headings of 'Data Controller', 'System Owner', 'Purpose of the System' and 'Operational Requirements'. These sections again form part of any Code of Practice for your system and are detailed below.

Data Controller and System Owner

The very grand title of Data Controller is basically the person who takes on day to day management of the system. Usually this will be the person who manages the premises and is very often the same as the system owner who commissioned and owns the installation. These two sections should be the first part of your Code of Practice.

Purpose of the System

This is what you want a CCTV system for, in very broad terms, and forms the first part of any Code of Practice. Normally your Purpose will be one or more of the following statements but this list is not exhaustive and may also include any other site-specific need:

- To help reduce patrons fear of crime.
- To help deter, detect and prevent crime by:
 - Providing assistance in the prevention, deterrence and detection of criminal activity.

- Helping to identify and apprehend offenders.
- Providing evidence to pursue criminal and civil proceedings in the courts.
- The maintenance of public order.
- To provide a safe working environment for residents, workers and visitors.
- To assist in the establishment of safe car parks.
- To create a monitoring system for employee behaviour and deter internal theft.

Operational Requirement (O.R.)

The creation of an operational requirement is the most important thing that you should do when commissioning a CCTV system. The Operational Requirement will set out what you wish to achieve from the system and should form conditions under which you will sign off the installation within any contract. If you inform the installer of the types of evidence that you wish to obtain within specified zones and the quality of the evidence that it produces as an end product they must then install a system which meets your requirement. Should the result be poor or not in accordance with your Operational Requirement you are in a stronger position to negotiate financially or ask them to rectify the situation with remedial works.

The Home Office has a very detailed method of describing an Operational Requirement and this can be used by going to the Home Office Scientific Development Branch (HOSDB) web-site and downloading their document 'CCTV Operational Requirements Manual 17-94'.

Whether you use the method described in this link or not you should still approach the proposed installation or expansion of any

CCTV system very carefully. It is recommended that you record exactly what it is you expect from your completed installation and ensure that the installer is both provided with a copy of this and is fully conversant with what YOU require. The installer can then tailor the equipment installed to your needs and expectations of the system.

The following notes should help to clarify what an Operational Requirement is and what sorts of things you should be asking for. It should be noted that this method could be utilised for any security installation whether this is CCTV, a burglar alarm, a security perimeter or access control system etc.

Zoned Camera Operational Requirement

The cameras should be set up to cover zones within your premises or site. This may involve grouping cameras with common purpose to obtain the required coverage. An operator wishing to target a specific area can then rapidly access such zones. Your aim should then be to write an operational requirement for each zone.

The Operational Requirement is an overview of what is to be achieved by the CCTV in any given zone. For example: It may be that you simply wish to detect disorderly or criminal behaviour of patrons in a specific room or location but be able to identify any person that subsequently leaves it.

Such requirements may include:

- Monitor persons in a specific zone. (*Usually controlled access areas.*)
- Detect persons activity within a specific zone.
- Recognise persons and show behaviour within a specific zone.

- Identify persons entering / leaving a specific zone. *(Usually referenced to a specific access point, especially the main door.)*
- Provide constant detection of persons moving from one zone to another.
- Effectively review the activities of staff within a specific zone or part of a zone.
- Effectively review interaction between staff and patrons within a specific zone or part of a zone.

System Operational Requirement

The second part of any Operational Requirement for CCTV is the quality of the overall system including its image recording system and recorded end product. To avoid repetition it can be advisable to cover the following points under the heading 'System Operational Requirement' with a footnote that all zones should comply with the listed principles. Again general terms are used without reference to specific Lux (light) levels, numbers of cameras or their technical specifications.

Some such considerations may be:

- The system should record images in colour. *(Black and white images provide much poorer evidence quality and make it more difficult to identify specific persons.)*
- The system should capture similar quality images despite varying light levels. *(Usually day and night.)*
- The system should capture the required quality of image despite any back-lighting from bright lights or windows.
- In most circumstances the system should record at least three frames per second, per camera. *(Evidence quality can be severely affected by using fewer frames per second and your aim should always be to*

get as near to real time recording as possible (approximately 25 frames per second).)

- The system should retain up to a specified number of days of recordings. *(You should retain images only as long as is operationally necessary. This may only be seven days, for some businesses open every day, but much longer for larger systems with more complicated purposes. As a general rule you should not store recorded images for more than a month.)*
- The system should be physically able to capture images useful to the purposes of the scheme and of a resolution high enough to meet the standards stipulated. (There is no point obtaining an Identification size picture on an exit camera if it is very blurred due to low resolution.)
- The system should be able to provide recorded images that can be used by the Police for the purpose of prosecution. *(This may entail provision of a 'video out' facility or suitable recording medium that conforms to Police systems. It will be up to the installer to check that their equipment is Police systems compliant before installation.)*
- External cameras should look like cameras and be prominently sited. Internal cameras can be more discreet, but nonetheless overt. *(This should apply unless there is a specific operational reason regarding the purpose of a camera in a zone; e.g. monitoring staff behaviour.)*

The basic points above may provide a skeleton for the Operational Requirement and should be added to with any site-specific purpose that you wish the system to achieve. Your Purpose, System Operational Requirement and Zone Operational Requirements should be written down and form part of the installation contract and conditions of completion. It is highly advisable to have this completed prior to the installer attending to provide a quote.

Image Collection and Recording

For maximum benefit, CCTV pictures should always be recorded and ideally monitored on a 24 hour, 365 day basis. If recording takes place on site, recording apparatus must be protected and securely stored – ideally in a windowless room designated for that purpose and with appropriate door security. This is for security of the images and ease of reviewing evidential tapes.

Image collection and recording is usually done at a central point. It is invariably impractical to fit each camera on your system with its own recording device. The exception to this rule is if you are only using a single camera.

With any system to be employed it is vital that the cameras record with as little compression, good resolution, good colour realism and as close to real time recording as possible (see Time Lapse Recording below).

It is recommended that you retain images for a minimum of 7 to 14 days and a maximum of 31 days for the majority of systems. Where systems will be unchecked for a specific number of consecutive days then the absolute minimum retention period should be no less than this number of days plus at least two. With any short retention periods the ability to archive evidence must be a stipulation in your Systems Operational Requirement.

If there is a trade off on any system being proposed, between frames per second or image quality, against length of time recorded images are stored, I would strongly recommend having a shorter retention period allowing a higher frame rate or facilitating a better quality of image. However, it is not advisable to go below the above minimum retention periods.

Dummy cameras are a short-lived deterrent and should never be used unless for a very limited period to deal with a specifically identified problem.

Methods of Recording Images

Before purchasing equipment to store footage from CCTV systems, it is essential to consider what the system is being used for and then ascertain which recorder should be used. Three methods exist to record footage, these being "real time", "time lapse" and "loop framestore" systems.

Real Time Systems offer the best quality of evidence as they provide a natural flowing image to the human eye by recording a high frame per second ratio. However the down side of this is that such large data volumes will quickly fill tapes, discs or hard drives of the recording medium.

Time Lapse Systems record a frame or image periodically rather than continuously. The interval can be set from a fraction of a second to several minutes. In order to obtain the optimum evidence using such a system you should be looking to capture at least two and ideally at least three frames per second. Some systems are capable of being manually switched to real time from time lapse. Such additional features are useful if someone is actively looking at the images as an incident occurs and is able to then record the specific incident in real time to obtain best evidence.

Loop Framestores are only really effective in systems that record only when a specific alarm has been tripped, either externally or within the system. They record onto a timed loop, the oldest image being re-written with the newest. Consequently, the owner of the system only records things that have triggered the system into action.

The vast majority of systems used in the business sector are Time Lapse, as these provide the best functionality and evidence quality against cost. It is therefore vital to specify your required minimum frame rate and image quality when commissioning the system.

Multiplexing

Where more than one or two cameras are to be used, they should all feed back to a Multiplex system for image collation and then recorded on a specialised S-VHS recorder, more commonly now, a DVD recorder, or similar quality system such as a dedicated computer hard drive. This differs in principal from Quad recording, which produces a much poorer quality recorded image.

Your multiplex unit and recording system are both vitally important pieces of equipment that can seriously effect the quality of image you are able to record. My advice is to purchase the best quality equipment that your budget will allow. It is always possible to add more cameras to your system reasonably cheaply but replacing the multiplex unit or recording medium can be far more expensive.

Digital Hard Drives

Digitised moving CCTV images will necessitate a large memory and operating speed. Again, do not get drawn into discussions with the installer over numbers or unnecessary technical details. Instead refer them to your Operational Requirement as this is your point of reference and they will have to quote for the equipment they need to achieve your stated purposes. As all companies invited to quote are given the same Operational Requirement they will be less likely to install substandard or unnecessary equipment. You should be wary of companies selling poor quality cameras and inadequate hard drives and deal only with reputable security companies, preferably with a National Securities Inspectorate (NSI), NACOSS, UKAS, SSAIB or similar accreditation.

The Police will almost certainly be the end users of images that you capture. Most criminal proceedings are progressed by the Police through the Crown Prosecution Service. Consequently we must insist that you record images that we are able to process for you. If you do not comply with this basic requirement we will struggle to use your evidence in any investigation.

Historically Super VHS has been the medium of choice for the showing of evidence to courts or replaying rapidly for investigation purposes but this is now being superseded by hard drives and DVD recorders. We would still recommend that any hard drive be fitted with a Video Out capability so that you can drop evidence onto Super VHS videotape or a quality CD/DVD-R. Following any incident this will allow you to quickly download usable images and evidence of offender identity for the Police Officers attending your incident. Additionally this can be used immediately and will not require time consuming processing by our Technical Support Units.

You may wish to use an alternative image recording and storage medium. However, you should only use Police approved storage media or we may not be able to use your evidence to prosecute an offender on your behalf. Your installer should contact the Police Technical Support Unit for details of which systems are currently supported. You should make this a stipulation for the Operational Requirement of your system.

Be wary of companies charging additional fees to download images onto such mediums as this works out very expensive and is not timely enough for most investigations reducing the practical worth of the system.

Monochrome (Black & White) – Colour – Infra Red

Monochrome cameras were once the industry standard and were much cheaper than colour cameras. Now colour cameras are far

more effective at capturing images in extremely low light conditions and cost similar amounts to similar quality Black and White cameras.

Colour cameras are preferable for their enhanced ability to describe and identify a person's skin tone, hair colour and clothing. I would recommend the use of colour CCTV cameras over black and white in almost any set of circumstances. If specific areas are too dark for their effective operation, lighting should be improved, wherever possible, rather than employing monochrome cameras.

Infrared cameras have almost no real use in the business market and are only really needed in areas where there is no light whatsoever. The lamps are very expensive to run and the systems are considerably more expensive to purchase, install and maintain. Such cameras are usually only used by military establishments or very isolated buildings with no surrounding or ambient light sources.

Most modern CCTV cameras will work down to very low light levels and need only the ambient light of fairly dim lighting to operate. As stated above your first and drastically cheaper option is to fit an additional lamp in the area to be covered and go for a colour camera.

Signs

Signs are often overlooked but have a valuable role to play in the deterrent effect of your system. Additionally you must display signs informing patrons that CCTV is monitoring them under conditions of the Data Protection Act. Ensure that there is adequate signage so that any person entering your premises could reasonably be expected to observe them and understand they are being monitored and who owns the system.

Data Protection and Evidence Handling

Normally business premises will be using their cameras for the protection and safety of its staff and patrons with an objective of preventing or deterring crime. As such video evidence may be needed to be obtained from the system for the purpose of a prosecution by the Police. It is therefore essential that the CCTV system be registered with the Information Commissioner and has at least a basic Code of Practice.

Code of Practice

A Code of Practice governs the use and maintenance of the CCTV system. This certainly does not need to be a long document and should cover, in simple terms, the system owner and data controller, its objectives, purpose and what measures are in place to ensure secure handling of recorded data. Many of the recommendations in this report may be used as a skeleton for such a Code of Practice.

Further information on this subject is available from the Governments Information Commissioners Office web-site: www.ico.gov.uk Once in the web site navigate through to the 'CCTV' Guidance Section and select the section relevant to your need. The site has codes of practice and user check lists which are all very useful for the business user.

There is also extensive and very good advice about the Data Protection Act in the CCTV section of the Devon and Cornwall Constabulary web-site. www.devon-cornwall.police.uk

Registration

Registering the system can be done via the Internet at www.ico.gov.uk and will cost £35 per year. This is very simple to do and you will be guided through the process by clicking on

'Notification' in the 'Quick Links box'. You should be wary of companies that offer to do this for you, as there have been scams that have charged far more than this.

The owner of the system will need to be identified along with who is the Data Controller (this may be the same person). You may find this has been done for you via a corporate registration. If you are the manager of premise in a corporate chain inform your head office and they will provide advice as to how to proceed.

Recent changes in the legislation mean that you only need to register if you are obtaining details of or monitoring specific individuals. This may not apply if you are going to use a system that has no pan tilt or zoom facility and is there only as a monitoring and deterrent tool. However should you subsequently intend to use the system to monitor an individual or staff member you will need to register under the act. The best advice is to register and you are covered by all eventualities.

System Use

Once your system is installed you should adopt working practices which ensure that your staff and managers are CCTV aware. This means that they know what kind of image can be captured throughout the various parts of the building and where any blind spots are.

You should ensure that you train adequate members of staff in how to operate the system to ensure an operator is always available. Should an incident occur, that results in police action, you will be expected to provide video evidence from all cameras running at the time. You should archive or separate such evidence at the earliest opportunity and ensure that it is stored in a safe and secure manner.

Finally

It is appreciated that the decision to purchase a CCTV system is not a cheap option. However, it is strongly felt that this is a very effective means of protecting material possessions, patrons and staff members. It has proven Crime Reduction credentials in the prevention, detection and investigation of crime or disorder. However, it should be clearly understood that it would be unrealistic to expect crime or anti-social behaviour to be totally prevented simply by buying a CCTV system and this should be only a part of your overall security strategy.

Crime prevention advice is given free without the intention of creating a contract. The police service does not take any legal responsibility for the advice given. It is felt that the recommendations made are achievable practical points that should benefit any person thinking of purchasing a CCTV system. The purpose of this advice is to provide you with an effective means to commission such a system and avoid some of the pitfalls surrounding its installation. These proposals, if fully adopted, will reduce the likelihood of a poor quality system being installed in your premises.

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