

Turret Clocks

1. Introduction

A turret clock that is in working order makes a positive contribution to the tower that houses it. A striking clock makes a particular aural contribution to the area around a church and is an ever-present reminder of the presence of the church that maintains it. Although turret clocks may no longer be relied on for the time, an out of use clock can have a negative impact that is surprisingly strong, giving an incorrect and negative message about the life of the church that owns it. A clock in good order is usually noticed and appreciated.

These guidelines are intended to assist Diocesan Advisory Committees (DACs), incumbents, churchwardens, architects and others concerned with church maintenance. They explain the importance of correct maintenance, some of which can be done within the parish, and set out what should be undertaken by a qualified and appropriately experienced clock maker. The guidelines explain relevant safety considerations, both for the public and for those working on or inspecting clocks.

Any parish contemplating work on a church clock is advised to consult its DAC at an early stage. Most DACs have a Clocks Adviser who will be able to assist the DAC in forming its advice to the parish. Early consultation with anyone responsible for any bells in the tower is also helpful, since some work to clocks can have implications for bells, perhaps most especially in a busy ringing tower.

Work on a clock, beyond routine maintenance, will require a faculty, which must be in place before work starts. Proposals to introduce a new clock, or, on rare occasions, dispose of an existing one, require a faculty, consultation with the DAC, and, for a clock of historic interest, the CBC. Your DAC Secretary or Archdeacon will be able to advise you.

Grant-aid towards the cost of restoration or repair may be available from the CBC or from other grant givers, including the Heritage Lottery Fund.

These guidelines have been prepared by the Clocks Committee of the Church Buildings Council (CBC). They bring together in one place advice in previous publications and guidance notes on both the maintenance of turret clocks and the installation of automatic winding (1982, 1984, 1996, 2005).

2. Conservation versus Restoration

Almost all turret clock movements are of some historical importance and should be kept in good condition and maintained in use wherever possible. Alterations that significantly affect the original mechanism should be avoided at all costs.

Turret clocks are often unique and some are very rare and should be sympathetically treated and their original features preserved. A relatively small number of outstanding clocks, some

bearing the names of prominent domestic clockmakers, were produced over a long period and these should receive special attention. The Antiquarian Horological Society can help to identify these clocks (contact details below).

A few early clocks may be so seriously worn or heavily corroded that the repairs or replacements necessary to restore them to sound working condition would destroy much of their character. Such clocks should be protected prevent further deterioration and remain in place out of use. In these, relatively rare, circumstances, using a new electric clock to drive the hands can be acceptable. Most usually keeping a clock in use will be the most effective way of conserving it. Unused or redundant clocks are almost always safer in the tower in preference to being displayed in the church. There will be exceptions to this when there is both space in the church for the clock and the willingness and interest to display it in a way that will help the wider public to appreciate it.

3. Routine maintenance

All practical work on turret clocks should be undertaken by qualified professional turret-clock makers following conservation principles. However, it is appropriate to have one person in the parish who has overall responsibility for the well-being of the turret clock. When a clock is hand wound this will usually be the person who winds the clock, or one of a team of winders. Where a clock has been converted to electric winding it is still good practice to have someone responsible for it and who is willing to visit the clock occasionally to see that all is well. Where possible it is good for the responsible person to have a deputy who will be trained to succeed them. For many clocks the responsible person will be able to set the time correctly, manage the hour change, and ensure that the clock housing is in good order and the doors kept shut to help protect the movement from airborne dust and grit. For some clocks the regulation of the timekeeping will be a matter than can be attended to locally and your clock maker will be able to advise you about this.

For the better operation and preservation of the clock it is important to have a maintenance contract for the clock with a professional clock maker sympathetic to historic clocks. Such a contract should include an annual visit to the church. Such maintenance is essential the clock's well being and, since it will include safety inspections of such items as weight lines, will enable the parish to be confident that the clock is safe for other users of the tower.

It is likely that the annual maintenance of the clock by the professional conservator will include:

- safety checks for the weight lines and pulleys
- lubrication
- removal of dirt and surplus oil
- maintenance of leading off work
- inspecting the pendulum suspension
- checking of clicks on great wheels and flys
- thorough inspection of the clock movement
- bell hammers (for striking/chiming clocks)
- automatic winding (if fitted)
- visual inspection of dials, hands and dial fixings

The clock mechanism should be kept as clean as possible. Excessive lubrication and the use of inappropriate grades of oil will encourage wear of the movement, which is why this is a job only for a professional. Gritty dust, pigeon droppings and similar harmful substances can be excluded by a dust proof case, ventilated to avoid condensation, with hinged or removable sections to give free access for maintenance purposes. A suitable case can also give protection to other gears associated with the clock, most commonly motionwork immediately behind the dials. If possible, electric lighting should be installed in the clock case.

We have become used to domestic clocks and watches that keep accurate time. The same expectations of time-keeping are sometimes made of turret clocks. The best turret clocks, with gravity escapements and temperature-compensated pendulums, fulfil such expectations if properly maintained, it must be recognised that simpler and earlier clocks will not be so accurate. The clock can usually be kept accurate to an acceptable degree by regular and minor resetting of the time. For clocks that are found problematic to adjust for good time-keeping there are various electronic control systems available commercially. These are usually considered for use on clocks with auto-winding and difficult access. When such a system is used it should be applied to a clock so that it can be removed and the clock left entirely as it was before the device was fitted. It is not necessary to make physical alterations to the clock itself to install assistance with timekeeping. However, it should always be remembered that such devices are no substitute for regular professional maintenance and should only be considered when the clock is in overall good order.

Additional technical information is available in the *Turret Clock Keepers Handbook*, see section 8 below.

4. Weights, pulleys and lines

Weights, pulleys, and the lines which support them must always be maintained in good condition, as their failure can cause a serious accident. They should always be inspected as part of the annual maintenance contract. There are, however, some matters that can be attended to by the parish to ensure the safe operation of the clock, most particularly in relation to the weights.

Weights should almost always be enclosed in chutes, with boxes of broken bricks, sand or rubble to absorb the impact if they should fall. It must never be possible for anyone to pass beneath them. Chutes must not be used as a run for electric cables and switches or to store rubbish or cleaning materials. It should not be necessary for anyone to have regular access to the weight chute. Extra weights must never be added to an existing one to force a neglected clock to work.

5. Dials and hands

Dials should be inspected regularly, both for their appearance and their condition. They can give rise to safety hazards if their fixings become insecure. The inspecting architect should be consulted in cases of doubt. Dials that require attention, whether internal or external, should be conserved, using traditional materials as far as possible. Advice can be sought from the DAC and, in the case of dials of historical or artistic importance, from the CBC.

Historic dials made of wood must be conserved if possible. Since dials are exposed to the full impact of the weather some will reach a condition of being beyond repair and replacement is sometimes necessary. Replacement dials should be accurate replicas made of a suitable hardwood and painted in appropriate colours, as agreed by the DAC. Where replicas are made of skeleton dials, glass fibre replacement, having the same appearance as the original, can be considered, although it is rare for a cast iron skeleton to be beyond repair.

Due to the harsh conditions that the dial and hands face, repainting will almost always require that the dial is stripped to its base material. This is not normal practice in conservation, or in the treatment of historic objects. It would almost never be advised for historic painted objects that are sheltered from the weather. Regilding should be carried out using 23.5 or 24 carat double-thickness English gold leaf to the original, or previous, design for the particular dial; gold paint is useless for this purpose. Opal glass in nineteenth-century cast iron dials illuminated from the back is best replaced with the same material when this is necessary. However, opal-type glass may not be available and on these occasions an acrylic substitute can be considered.

Damaged or corroded hands should be repaired wherever possible, or, as a last resort replacements made to the same design using the same materials as the original. Hands should always be carefully balanced, internally or externally as appropriate, after the work is completed.

As with all other types of conservation, work to clock dials should be documented with a written description of the work done, including details of all materials used, illustrated with clear photographs.

7. Bells and bell hammers

Any work which may affect the ringing of the bells should be discussed with the tower captain and advice sought from the DAC.

Bell hammers and their associated cranks and wires can easily be neglected, but should receive regular inspection and lubrication of all moving parts as part of the annual maintenance of the clock. The tower captain may wish to be present for this inspection. Bell hammers must not rest on their bells as this creates a serious risk of cracking the bell and spoils its sound. This should be checked regularly and hammer springs readjusted as necessary. A hammer should always strike its bell at right angles, on its thickest part and in such a position that it does not cause the bell to swing. If a bell has been quarter-turned because of clapper wear, the clock hammer must not strike immediately over the worn area. When bells are hung for ringing, any clock hammers must be able to be lifted clear, otherwise there is a risk of damage to hammers, bells or their mountings during ringing. The pull-off wires must be operated from the ringing chamber and there should be some clear indication when this has been done. If there are electric clock hammers there will be an isolating switch to pull them off the bells. This switch should be prominent in the ringing room with a clear indication to the ringers that it is safe to ring.

There is an increasing demand for church clocks to be silenced at night. Electrical units for this purpose are available as standard items.

7. Automatic winders and electric drives

For a variety of reasons it sometimes becomes impractical to find someone in a parish to wind the clock on a regular basis. In a limited number of cases this problem might be managed by providing safer access to a clock that is presently difficult to reach, or relocating the movement within the tower – a less satisfactory solution from a historical point of view. A more satisfactory solution is provided by the use of automatic electric winders, now a well-established practice. It is vital, however, that the integrity of the clock is preserved. Only in exceptional cases is it acceptable to substitute a synchronous motor drive to the hands of an existing clock, since it entirely alters the technical character of the installation. In such cases the original movement should be preserved alongside the electric one.

The clock must always remain completely intact so that it is possible to put the clock back to its original state simply by removing the added parts, without leaving any signs that automatic winding has ever been fitted. The following requirements should be observed:

- 1) No parts should be removed from the movement.
- 2) The original weights and pulleys should be retained at the church, clearly labelled to prevent accidental disposal.
- 3) There should be no cutting or drilling of the clock frame. Any essential attachments can be made by clamping plates, care being taken that the frame is not damaged.
- 4) Motors must be rigidly supported so that there is no risk of driving chains jumping their pulleys.
- 5) It is therefore advisable to have the movement cleaned when automatic winding is fitted, unless this has been done recently.
- 6) Suitable power supplies must be provided by a qualified electrician in accordance with the relevant regulations.
- 7) Weight chutes, although no longer in use, should ideally be preserved and protected in the event of returning the clock to manual winding, unless other necessary developments in the tower makes this impossible.

The Council also advises that:

- 1) Auto-winding should normally be applied to the barrel arbor.
- 2) In exceptional circumstances, and where this can be demonstrated to be for the benefit of the clock, auto-winding may be applied to the 2nd arbor, but never any higher in the train.
- 3) Winding jacks must never be used as part of an auto-winding installation.

It follows from the above that direct electrical drives must not be applied to the fly arbor of a striking or chiming train. Application of auto-winding to the barrel arbor is normally preferred to prevent inappropriate wear on wheels and pinions and to ensure smooth and consistent operation of the striking train.

Many carillon or tune-playing mechanisms have survived and should be preserved, as they are of historic interest. The driving weights are very heavy and hand winding is an arduous task. It is possible to adapt these for electrical winding, but never direct electrical drive.

Automatic winding mechanisms will normally be included in an annual maintenance contract. The presence of automatic winding does not remove the need for at least an annual visual inspection of the clock to ensure that all appears to be well and to regulate the time keeping. Pendulum regulators are available to regulate the time keeping of clocks. They are not a substitute for the occasional visual inspection of the clock.

8. Further sources of information

In addition to your DAC and the Church Buildings Council, the following will be of use to you in the maintenance of your clock. Details of grants offered by the CBC, together with an initial enquiry form can be found at **www.churchcare.co.uk**.

Historical information and guidance on technical matters can be provided by the Turret Clock Group of the Antiquarian Horological Society, New House, High Street, Ticehurst, Wadhurst, East Sussex TN5 7AL. Tel: 01580 200155. Website: **www.ahsoc.demon.co.uk/turret/turretindex.html**.

The *Turret Clock Keeper's Handbook* is one of a set of guides written by Chris McKay and is available to download at **<http://homepages.tesco.net/~chris.mckay/index.html>**. These guides explain many technical matters in far greater detail than is within the scope of this leaflet. The information given in them is no substitute for employing a professional clock maker to maintain you clock.

Accreditation is now available for clock makers, and details of clock makers accredited in conservation can be found at the Conservation Register of the Institute of Conservation (Icon) at **www.conservationregister.com**. Accreditation for clock makers through this scheme is a fairly new development at the time of writing (2008) and the Register should become more comprehensive in the coming years. If the register does not provide any useful contacts for you there is an additional source of information from the British Horological Society, at **www.bhi.co.uk/repairer.html**. If you use the latter register it is essential to ensure that the clock maker is experienced with turret clocks and that they are sympathetic to conservation principles.

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Church House
Great Smith Street
London
SW1P 3AZ