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Diocesan Advisory Committee
for the Care of Churches

CHURCH CLOCKS

CONTENT

1	<u>INTRODUCTION</u>	2
2	<u>HISTORY</u>	2
3	<u>BASIC CARE</u>	2
4	<u>SAFETY</u>	2
5	<u>MAINTENANCE</u>	3
6	<u>CLEANLINESS</u>	3
7	<u>REPAIR AND RESTORATION</u>	4
8	<u>WINDING</u>	4
9	<u>AUTOMATIC WINDING UNITS FOR CHURCH CLOCKS</u>	4
10	<u>ADVICE AND INFORMATION</u>	5

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1 INTRODUCTION

- 1.1 Many of the churches in our Diocese have a **turret clock** and almost all of them are of historic interest. It is important that this heritage is preserved and the best way of doing this is to keep the clock clean, well maintained and running. With proper care and maintenance mechanical clocks will last almost indefinitely.

2 HISTORY

- 2.1 Church clocks dating from before the early 1700s are quite rare and most of those that survive are non-working exhibits in churches and museums. Up to the end of the eighteenth century they were generally the result of the skill and ingenuity of an anonymous local clockmaker or blacksmith, although there were a few made by prominent domestic clockmakers and these are of special historic interest. Most, but not all of these, have been replaced, because although they gave good service over many years they tended to be unreliable and were not particularly good time keepers. These clocks were made before gearing and bearing design was fully understood. The next generation of church clocks up to about 1850, benefited from a better understanding of these technologies and many are still giving good service.
- 2.2 The majority of our church clocks were installed during the next eighty years or so, generally as replacements of earlier clocks. Typically, they have cast iron “flat bed” frames and were manufactured to a very high standard - a standard which would still be relevant today. Since the 1930s a number of clocks have been converted or replaced using a synchronous electric motor. These utilise mains frequency to provide very accurate time keeping. The most recent innovations are electric automatic winding and night silence devices.
- 2.3 Historic details of church clocks are often given in churchwardens’ accounts and other parish papers. General historical information on turret clocks may also be provided by the DAC Clocks Adviser.

3 BASIC CARE

- 3.1 Accurate timekeeping, reliability, longevity and safety all depend on good basic care. The clock should be kept clean and where appropriate wound with care. Those who have contact with it should be able to identify potential problems, know what to do in the case of breakdowns and where to go for advice.
- 3.2 Regular maintenance is essential and a maintenance contract is a sound investment. However, it is important to know what to expect from such a contract and exactly who is responsible for what.
- 3.3 The mechanical safety of the clock and, in particular, the physical safety of the people who have contact with it, are of paramount importance.

4 SAFETY

- 4.1 Access to the clock mechanism should be kept locked at all times. An open clock cupboard is no different to unguarded machinery in a factory. All access ladders and platforms should be checked regularly.

Advisory Committees for the Care of Churches in the Dioceses of Coventry and Leicester

- 4.2 The bell hammer must be lifted clear of the bell during bell ringing by means of a pull-off wire hanging in the ringing room. There should be an appropriate notice to this effect near the pull-off hook. Before entering a bell chamber it is important to check that all bells have been left in the safe 'down' position.
- 4.3 Weight lines should be checked for fraying, kinking or other damage, and weight pulleys checked for wear and damage. Turret clock weights are very heavy, often weighing several hundred kilograms. They must therefore be confined within a weight duct. It should not be possible to walk beneath suspended weights or to fall down the weight duct. Regular inspection and maintenance of ratchets and clicks is most important. Sand bags or similar should be placed at the bottom of the weight duct to absorb the impact should a weight fall due to breakage of a line or pulley, or failure of one of the barrel ratchets. The sudden release of energy as a result of such a failure can result in extensive damage to the clock mechanism. The "fly" is a wind vane, which controls the speed at which the clock strikes or chimes. If the clicks on the fly fail, the train will accelerate dramatically to the point where some components will be destroyed.
- 4.4 The pendulum suspension spring must also be inspected regularly for corrosion, signs of fatigue and buckling.
- 4.5 Dials also need regular inspection and this can be carried out using binoculars. It is important to check that the dial fixings remain sound and that the hands are not corroded to such an extent that they are in danger of falling off. Also check that the nut that secures the minute hand is still in place.

5 MAINTENANCE

- 5.1 It is sensible to entrust the proper inspection and maintenance of the clock to a turret clock specialist. Apart from attending to clock related safety, the maintenance visit should include inspection of all components for signs of wear, corrosion, lack of lubrication and build up of dust and grit, as well as any necessary adjustments. Proper maintenance will save on the cost of repairs and restoration in the future.
- 5.2 Only turret clock oil should be used for lubrication - car engine oil, '3 in 1', 'WD40' and grease have no place in the clock room. Once a year one spot of oil should be applied to the pivots only. The escapement should not be lubricated at all, particularly if the clock has a 'gravity' escapement. Bare iron and steel surfaces can be protected from corrosion by lightly wiping over with an oily rag.

6 CLEANLINESS

- 6.1 Dust and grit are the main enemies of the church clock. Mixed with oil they make a grinding paste, which will cause rapid wear to the contact surfaces of all moving parts. Most of the dust will be old bird droppings falling through the joints in the floor above the clock. Clocks are usually enclosed in a cupboard and this will keep out some of the dust and grit. It is wise to inspect the enclosure carefully for holes and cracks, particularly above the clock, and seal up any that are found. Check especially the condition of, and replace if necessary, the leather flaps which act as seals where weight lines, strike wires and take-offs to the dials pass through.
- 6.2 If any building work is to be carried out inside the tower, it is a good idea to stop the clock and sheet it down to protect it from dust and grit.

7 REPAIR AND RESTORATION

- 7.1 If the clock stops or breaks down a recognised turret clock specialist should be called in to effect repairs, unless there is an obvious and simple solution. Boded repairs by well meaning amateurs must be avoided at all costs. If appropriate, the DAC Clocks Adviser will visit to assess the problem and advise on a course of action. Eventually, the clock may require a complete overhaul. Again this work is best entrusted to a recognised specialist who will provide a guarantee. It is wise to seek at least two quotations and a faculty will almost certainly be required.

8 WINDING

- 8.1 For centuries, church clocks have been wound by dedicated local enthusiasts. Often the job was passed down from one generation to another in the same family, and it was a matter of pride that the clock always told the “right” time. However, it is becoming increasingly difficult to find these willing volunteers and many clocks have been converted to automatic winding, and in some cases the clock has even been removed and replaced by an electric motor.
- 8.2 In the past the installation of automatic winders has sometimes resulted in irreparable damage. Current guidelines, however, ensure that this no longer happens. Modern automatic winders are very reliable and can be fitted to most clocks without cutting or drilling the frame or removal of any of the components except weights, lines and pulleys, and these must be retained with the clock.
- 8.3 However, the installation of automatic winding should not be considered without first making every effort to find a local person who is willing to continue winding the clock and if necessary take some advice from the DAC Clocks Adviser regarding looking after the clock. If this search is unsuccessful and automatic winding is considered, the DAC should be consulted for advice at an early stage.
- 8.4 **Such work will require a faculty** and it should be remembered that the clock will still need regular attention, not only to correct the time, but also to establish that all is well. Clocks with automatic winding should be visited at least once a month. The replacement of a clock by a modern electric motor is the last resort and only if the clock is completely worn out has been inspected by the DAC Clocks Adviser will a faculty be considered.

9 AUTOMATIC WINDING UNITS FOR CHURCH CLOCKS

- 9.1 Electric automatic winders are usually fitted to a church clock because the parish is unable to find a reliable volunteer to hand wind it. In this situation the only other alternatives are to leave the clock idle, or to replace it with an electric clock.
- 9.2 There are three other good reasons for fitting modern automatic winding units (i.e. those that run the clock by driving an arbor above the winding barrel, have small weights which fall a maximum of 3 metres, and operate on low voltage) even where the parish has a clock winder. They are:
- Where the existing heavy weights are hanging above or near an area where people have access. For example, automatic winders have been fitted to Lutterworth church clock where the original weights of some 700 kg were hanging in a room directly above the font. The consequences of a weight line breaking do not bear thinking about. The clock now runs on a total of 20 kg.

Advisory Committees for the Care of Churches in the Dioceses of Coventry and Leicester

- Where there is evident damage or excessive wear to the teeth on the great wheel or the second wheel. If one or more of the weakened teeth should break off the weight would fall rapidly, causing excessive damage to anything in its path. The shock reaction would also result in further damage to the clock. If an automatic winder is fitted these wheels become idlers, with only a very small driving force on their teeth. For example, the clock at Chelveston Church, Northamptonshire, is to have an automatic winder fitted to the striking train because the second wheel has seven replaced teeth. It is considered that they are not strong enough to withstand the forces set up by the original heavy weight. The going train is to remain hand wound.
- 'Running through' is a situation where the weight falls rapidly because a click or click spring has failed on the winding barrel or the fly. This often causes excessive damage to the clock, but it is not possible if an automatic winder is fitted. Many of our clocks are 100 or more years old and the chances of a 'run through' on hand wound clocks are increasing as components wear and springs get weaker.

9.3 Thus modern automatic winding units fitted in the approved manner ensure that clocks keep running in the traditional way, they ensure the safety of people around the clock, and the safety of the clock itself.

10 ADVICE AND INFORMATION

10.1 The DAC Clocks Adviser is available to give advice on any aspect concerning church clocks. This includes repairs, overhauls, restoration, installation of automatic winding and night silencing equipment, and historical research. The Clocks Adviser can be contacted via the DAC Secretary. Contact details are also given in the current Diocesan Directory.

10.2 Names and contact details of recognised turret clock specialists can be obtained from the DAC Clocks Adviser, or the British Horological Institute, Upton Hall, Newark, Nottinghamshire.

10.3 The Turret Clock Group of the Antiquarian Horological Society can also advise on technical and historical matters. They can be contacted via The Antiquarian Horological Society, New House, High Street, Ticehurst, Wadhurst, East Sussex. TN5 7AL.

10.4 Publications which might be helpful: -

Turret Clocks - Guidelines for their Maintenance and Repair and for the Installation of Automatic Winders. 1996. Published by Church House Publishing for the Council for the Care of Churches, Fielden House, Little College Street, London. SW1P 3SH

An Amateur's Guide to Automatic Winders David Nettell. 1987. Published by Gardiner-Caldwell Communications Ltd., The Old Ribbon Mill, Pitt Street, Macclesfield, SK11 7PT (Useful for a description of the various types of automatic winders)

The Horological Directory 2001 Edited by R.F.S. Snelling. Available from British Horological Institute, Upton Hall, Upton, Newark, Nottinghamshire NG23 5TE (Directory of horological specialists and suppliers - to be updated every two years)

Turret Clock Services - A List of Specialist Repairers of Church and Public Clocks and their Services Michael Applebee. 1996. Published by Michael Applebee, The Mill, Sutton-on-the-Hill, Derbyshire. DE6 5JA

Advisory Committees for the Care of Churches in the Dioceses of Coventry and Leicester

Turret Clocks in Leicestershire and Rutland P. A. Hewitt. 1994. Published by Leicestershire Museums Arts & Records Service and available at museums and the Leicestershire Record Office. (This book includes brief historical details of almost every church clock in Leicestershire)

The Turret Clock Keeper's Handbook – A Practical Guide to those who Look after a Turret Clock Chris McKay. 1998. Published by Antiquarian Horological Society, New house, High Street, Ticehurst, East Sussex. TN5 7AL