Derby Diocesan Association of Church Bellringers Consultant's Report	Report no. DDACB 03/004
Inspection of Six Bell Installation at Christ Church, Burbage	Issue date: 20/09/04

1.0) Introduction

Mr Eric Barnes requested an inspection of the bell installation and this was carried out on 6 September 2004 by Robin Lyon and Mike Banks (bell consultants to the Derby Diocesan Association of Church Bellringers). Gordon Halls carried out the last inspection in July 1996.

The church was built in 1860/61 by H Currey and is one of the buildings erected in connection with the 7th Duke of Devonshire's plan for the development of Buxton.

2.0) Tower

The six bells are installed for full circle ringing in a stone-built tower at the west end of the church. This tower is of unusual design with circular bell louvres (two per side) and a pyramid roof. Ringing is carried out from the first floor and at the time of construction it is likely that there was no clock / intermediate room between the ringers and the bell chamber floor. (The good finish on the bell chamber floor beams and their supporting corbels were meant to be seen). The clock appears to have been originally positioned above the bells where the old clock case can still be seen. Since the bells would have been very loud in the ringing room, an intermediate room was formed (possibly in 1899 when the bells were retuned) and the clock relocated in this room. The floor of this new room is set below the tops of the ringing room windows. The clock drive now passes vertically through the bell frame to a bevel box set in the old clock case.

Access to the ringing room is via a wide spiral staircase in the NW corner of the tower. Ongoing access to the intermediate room and bell chamber is via a sloping iron ladder in the NE corner of the tower.

3.0) Ringing Room (See Figure 1)

The ringing room is reached via 14 steps up the spiral staircase. The entrance is closed by means of a curtain and the room is 3.3 metres square with a ceiling height of 3.2 metres. There is good natural light from four windows, two in the west wall and two in the south wall. Artificial light is also good from a single fluorescent tube, however for safety it is good practice to have a twin tube installation to guard against loss of light in event of a tube failure during night-time ringing.

There is no trap door in the ceiling for removal of the bells but the boarding shows evidence of an area which might be readily removed.

4.0) Intermediate Room (See Figure 2)

The intermediate room is reached through a trap door via 14 rungs of an iron ladder. It has the same cross section as the ringing room but with a ceiling height of 2.1 metres. The tops of the ringing room windows protrude 500 mm above the floor surface and to reduce transmission of bell noise down to the ringing room, this floor protrudes into the window openings. Lighting is good from a single fluorescent tube and the room is clean.

There is an auto wound clock in a case on the south wall.

5.0) Bell chamber (See Figure 3)

The bell chamber is reached through a further trap door by 8 more steps up the iron ladder. The floor is supported on 300X300 mm wooden beams, one along each wall and a single NS central beam. These in turn rest on corbels, one in each corner and one in the centre of each wall. The chamber is almost 3.4 metres square and contains two circular louvres in each wall set 0.7 metres above the floor. Entry of birds through these louvres is successfully prevented by wire mesh on some and wooden infill of the louvre slats on others. The chamber is lit by an electric light in addition to natural light from these louvres.

A further iron ladder gives access to the old clock case installed above the bells and containing the bevel drive to the clock face in the south wall.

6.0) The Bells

The original five bells were cast in 1861 and then augmented to six in 1883. Taylor's subsequently retuned them in 1899. Details (taken from "The Church Bells of Derbyshire" written by Pat Halls and George Dawson)
are as follows.

BELL NUMBER	FOUNDER	DATE	WEIGHT kgs (cwts-qtrs-lbs)	DIAMETER mm
1	John Taylor	1883	219 (4-1-7)	699
2	John Taylor	1861	258 (5-0-10)	775
3	John Taylor	1861	303 (5-3-24)	832
4	John Taylor	1861	318 (6-1-0)	848
5	John Taylor	1861	362 (7-0-15)	914
6	John Taylor	1861	458 (9-0-2)	1000

The back five bells have been 1/8 turned and their canons removed. This was presumably done in 1899 when the bells were retuned. All bells show moderate to heavy indentation at the clapper strike points. Indentation is particularly heavy on bell six especially where the service hammer strikes in the same place as the clapper. It would be worth considering having this bell

¼ turned to prevent the continued advance of wear in the current strike positions.

The clock strikes on bell 6 by means of a hammer passing through the wheel.

7.0) Clappers

All bells are fitted with clappers having independent crown staples. The independent crown staple comprises a rod which passes axially through the head of the bell carrying the clapper pivot pin at its inner end and a threaded outer end carrying a nut, washers and split pin. The nut should be of the castellated variety and the split pin should pass through the castellations thus locking the nut. None of the clappers is secured in this way! The clapper swings about the pivot pin and is bushed with a low friction bearing material which eventually wears and allows unwanted sideways movement of the clapper. Findings were as follows:

Clapper 1. Moderate wear on strike faces – acceptable sideways play in bush – crown staple tight in headstock.

Clapper 2. Moderate wear on strike faces – close to needing rebushing – crown staple tight in headstock.

Clapper 3. Moderate wear on strike faces - close to needing rebushing – crown staple tight in headstock but split pin too high up thread to lock nut.

Clapper 4. Moderate wear on strike faces - close to needing rebushing – crown staple tight in headstock but split pin too high up thread to lock nut.

Clapper 5. Moderate wear on strike faces – needs rebushing – crown staple loose in headstock.

Clapper 6. Strike faces in poor condition – needs rebushing and refacing – crown staple loose in headstock.

8.0) Headstocks

Each is of cast iron box section construction with all gudgeon pins and bell holding bolts secure. There appears to have been a repair to the inside surface of number 4 headstock where the gudgeon pin fits on the opposite side to the wheel. This is unusual but appears to be sound.

All headstocks are rusty, particularly on the undersides. Oil and rust should be removed and either two coats of “Hammerite” paint applied or a primer of red oxide followed by under coat and then gloss topcoat.

9.0) Headstock Bearings

The bells were not rung during the inspection and so assessment of the ball bearings was not possible. During manufacture these bearings were

lubricated for life with a special lubricant which is retained by a shaft seal. Provided there is no leakage past this seal there is no requirement to carry out any maintenance work on the bearing assemblies. Subsequent use of an incorrect lubricant may reduce the life of the bearings.

All bearing housings and headstock end faces are covered in a film of oil. The extent of this contamination is more than could be expected from simple leakage of the manufacturer's lubricant and indicates that the bearings have been relubricated. The fluid used and its method of application is unknown.

10.0) Stays and Sliders

All stays are of the Hastings type having a dingler at the end. Each wooden stay should be held in its headstock pocket by two bolts such that the head of each bolt bears directly on to the surface of the stay and the nut bears onto the outside of the headstock. If only one bolt is fitted it will work loose and the stay will break more easily. If both the head and nut bear on to the outside of the headstock, the stay will be loose and will break more easily. Findings are as follows:

No 1 – stay has only one holding bolt and this incorrectly fitted - dingler worn but serviceable.
No 2 – stay has only one bolt – dingler ok
No 3 – stay ok - dingler loose but serviceable.
No 4 – stay needs tightening – dingler very loose and fixing screw missing on one side.
No 5 – stay held by one bolt only – dingler ok.
No 6 – stay has one bolt only.

The dingler passes either side of an "S" shaped runner until it hits a hardwood stop. It is this stop which prevents the bell from being overturned. Findings were as follows:

No 1 – hardwood stop worn.
No 2 – hardwood stop badly worn on one side.
N0 3 – ok
No 4 – ok
No 5 – ok
No 6 – ok

It is recommended that the hardwood stops be replaced for bells 1 and 2.

11.0) Wheels

All wheels are in good condition although their metal fittings are rusty. One spoke on wheel 6 has been broken and subsequently repaired with a metal strip - it appears to have suffered following an attempt to raise or ring the bell without first fully withdrawing the clock hammer.

12.0) Ropes

The ropes on bells 1,3,4 and 6 require urgent attention due to wear within the wheel garter holes, some are very close to failure.

13.0) Pulleys

There are double pulleys fitted to bells 2 and 5, all of the rest are single. All pulley wheels run on ball bearings and most are in good condition. The pulley wheel on bell 4 has some side play and the bearing on one pulley wheel for bell 5 is close to failure. It is recommended that these two pulleys be repaired.

14.0) Bell Frame (See Figure 3)

The frame is a high-sided “H” frame. Cast iron “H” frames support the bells and rest on steel grillage beams which are set into the walls of the tower. The top of the frame is attached to the centre of each wall for lateral stability.

Although structurally sound, there are areas of deep rusting in the frame particularly on the lower parts of the grillage beams. It is strongly recommended that the rust be removed and all metal surfaces painted (see recommendations).

15.0) Recommendations

The bell installation is basically in good condition but is reaching the point where some remedial work is necessary to ensure future generations continue to enjoy the bells.

14.1 Work generally requiring involvement of professional bellhangers:

- Consider ¼ turning of bell 6.
- Rebush clappers 2,3,4,5 and 6.
- Reface the strike surfaces of clapper 6.
- Replace the ball bearing in one wheel of pulley 5 (can be done by competent DIYer).
- Remove the wheel from pulley 4 and rectify bearing looseness (can be done by competent DIYer).
- Replace hardwood stops in runners for bells 1 and 2 (can be done by competent DIYer).

14.2 DIY work.

- Using a wire cup brush in an angle grinder, remove all rust and scale from the bell frame metal surfaces. Of particular importance are the steel grillage beams but all other metal parts such as wheel fittings, headstocks, bell holding bolts, frame sides and upper steel framework

should be treated as well. Prime with red oxide paint and then apply an undercoat and a gloss topcoat. Alternatively two coats of Hammerite paint could be applied.

- Ensure all stays are correctly bolted in place in their headstocks – pay attention particularly to stays 1,2,4,5, and 6.
- Tighten the crown staples for bells 5 and 6. To do this two people are required, one below the bell and one above with a spanner. The person below must hold the clapper against the bell lip in the centre of the strike point and then the nut can be tightened against the headstock by the person with the spanner. Be sure to use a castellated nut correctly locked by a split pin.
- Replace or refurbish the ropes on bells 1,3,4 and 6.

Advice is given in good faith but no liability is accepted.

Mike Banks
Bell Consultant to the DDA

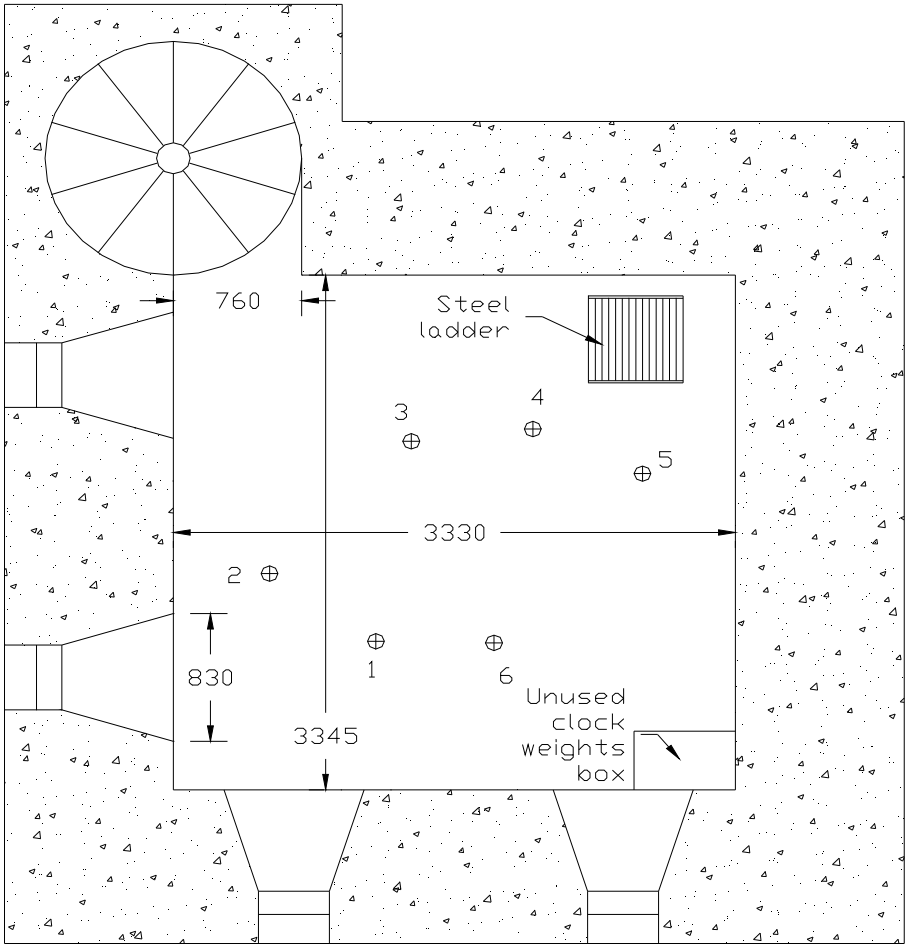

FIGURE 1 RINGING ROOM

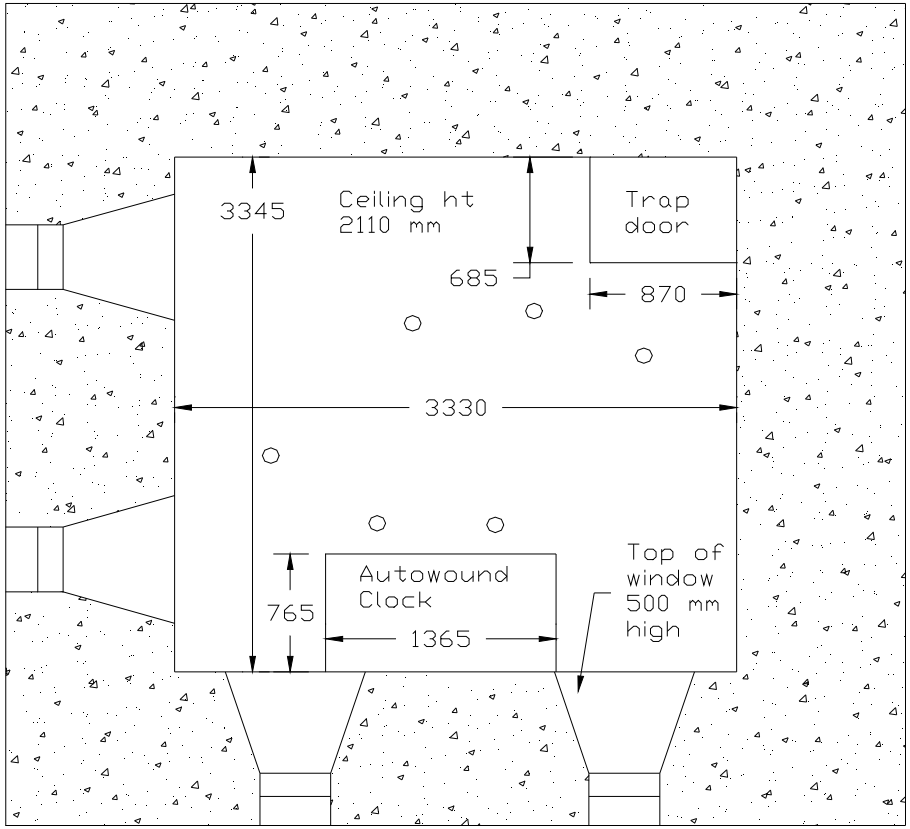

FIGURE 2 INTERMEDIATE / CLOCKROOM

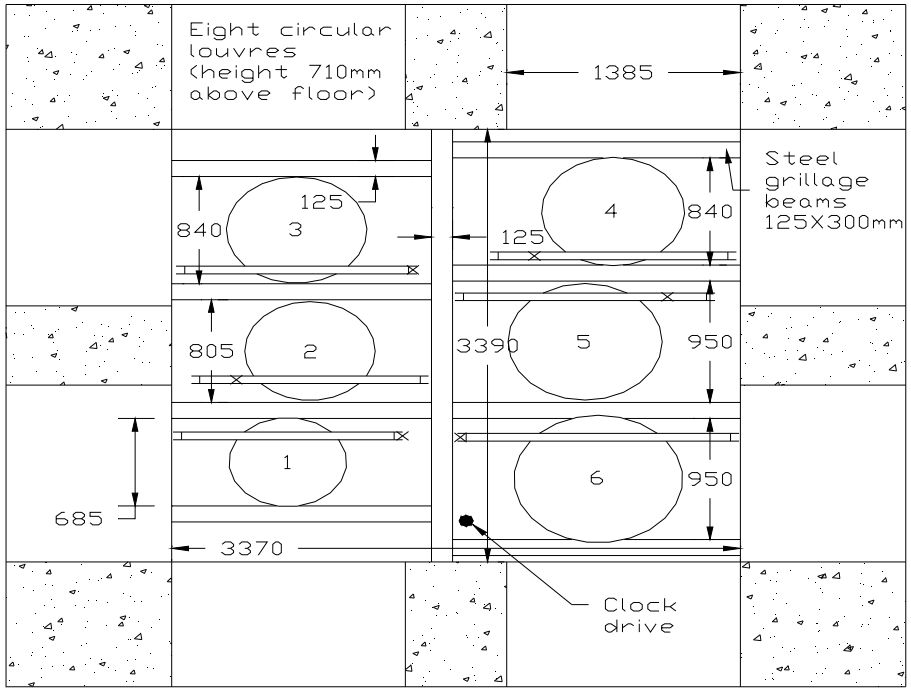

FIGURE 3 BELL CHAMBER – "H" FRAME LAYOUT SHOWING (FOR SIMPLICITY) ONLY GRILLAGE BEAMS