

Derby Diocesan Association of Church Bellringers	Report DDACB 11/05
Inspection of Bell Installation at the Church of All Saints Wingerworth	Issue Date 24/10/05

1.0 Introduction

A visit had been made by John McCartney (DAC Bells Advisor) and Mike Banks (Bell Consultant to the DDACB) on 15th. September when local interest had been expressed in ringing the bells from ground floor level again and improving the ringing circle at the same time. In John's letter dated 19th. September to Mr. A. Harrop he had recommended that a full inspection of the bell installation should be carried out which would highlight any further work that may be required.

Mr. A. Harrop had requested the inspection on behalf of the PCC. Bell consultants Mike Banks and Robin Lyon carried out the inspection on 14th. October 2005.

2.0 General

The five bells are housed in a stone - built tower at the South West end of the church. There are four small lights on each aspect of the wooden roof. Four louvred openings, one on each aspect, at bell chamber level and a single louvre in the East Wall at the level where the present ringing chamber is located

On the West wall at ground floor level is a wooden door which once served as an entrance to the original ground floor ringing area. This is now used as a fire escape for ringers descending from the present ringing chamber in the event of a fire in the ground floor area (Figure 5) immediately under the ringing chamber.

The tower appears to be of sound construction with no obvious signs of structural weakness.

3.0 Ground Floor (figure 5)

Entry to this area is gained by entering through the main church door and turning left. The area is sectioned off from the main body of the church by a tall screen with a wide opening. There is plenty of natural light which enters the area from above the screen. If ringing was to be undertaken from this area the ceiling height is acceptable. Of wooden construction, it is 6.6 metres above the floor which is safe in the event of a ringer being carried up following the breakage of a stay. The area at the moment is filled with ladders and other assorted items. In the event of ringing from this area these items would need to be accommodated elsewhere.

4.0 Ringing Room (figure 4)

Reached by a spiral staircase (24 steps) the room is almost square in section allowing for the built in spiral staircase. The area is carpeted and illuminated by a single fluorescent light. The height of the wooden ceiling is quite low (2.97m.) and the noise of the bells in the chamber, although not measured, is reported to be louder than the ideal. There also appeared to be signs of water

ingress at ceiling level. The ringing circle is awkward (see Figure 4) and ringing bells 2 & 3 could be a problem for inexperienced ringers.

5.0 Bell Chamber (figure 3)

Reached by climbing a further 12 steps entrance to the chamber is through a small wooden door measuring 440 wide x 770 high. The floor is of substantial wooden section with a trapdoor located in the North East corner, of sufficient size for the largest bell to be passed through. The tower is offset on the North, South and West aspects and the two foundation beams running East West are supported for half their respective widths on the offset. These beams of substantial section, and keyed into the wall at each corner, appeared to be in excellent condition. The floor was in need of a good clean. The chamber is illuminated by a single filament bulb located above the bell frame. The four louvres, one on each aspect, were all covered by wire mesh and galebreaker and there was no sign of bird ingress. The wooden roof appeared to be in good condition and the four small lights were well covered. Access to the narrow parapet on the outside of the roof is gained by climbing a ladder adjacent to Bell No 1 and through a wooden door located on the West wall.

6.0 Bell Frame (Figures 1 & 2)

The frame is of composite construction. The bells are hung on cast iron 'A' frame members bolted to wooden beams at both the lower and upper levels.

The wooden beams at the lower level are of substantial section and securely bolted to the foundation beams. The upper level beams of substantial section are fixed into the walls at both ends.

The cast iron A frames, carrying the bells, are 1270mm at the base and 260 mm at the top, with web thickness and cross sections varying according to the loading, are securely bolted to the wooden beams at both the lower and upper levels making the complete frame structurally sound.

7.0 The Bells

All five bells are hung for full circle ringing on ball bearings. Details (taken from "The Church Bells of Derbyshire" by Pat Halls and George Dawson) are as follows

Bell No	Diameter mm. (ins)	Weight Cwt-qr-lb	Date	Founder
1	686 (27)	4-1-17	1886	J Taylor
2	762 (30)	5-2-6	1886	J Taylor
3	778 (30.625)	6-1-2	1886	J Taylor
4	895 (35.25)	7-3-22	1886	J Taylor
5	991 (39)	11-0-9	1886	J Taylor

All the bells show very little wear at the point of clapper impact on the sound bow. None of the bells had been quarter turned about the vertical axis to present an unworn surface to the clapper. Bells 1,2 and 3 still retain their canons. (the loops on the crown used to fix old bells to their headstocks) although the original cast-in crown staples have been removed and replaced with independent crown staples.

All bells appear to be bolted firmly on to their headstocks.

8.0 Bell fittings

8.1 Headstocks/Gudgeons/Bearings The headstocks are of sound wooden construction. Each headstock has two gudgeon pins (the stub axles on either side which are carried in the main bearings and about which the bell rotates) which are bolted to the underside of each headstock. Each gudgeon pin is fixed to the wooden headstock by four through bolts which were all found to be tight apart from one on Bell No 5 (North East corner) where the nut was found to be slack. This was tightened during our visit. All the headstock bolts should be checked on an annual basis since steel bolts fitted through wooden components always work loose due to expansion and contraction of the wood with changes in humidity.

The ball bearing housings show no sign of oil leakage and require no maintenance. They must not be greased as they are sealed for life. All appeared to be in good condition and were firmly attached to the cast iron A frames. All the metal fittings should be wire brushed and painted.

8.2 Stays and sliders

All the stays and sliders are in good condition and well fixed. There is some wear on the slider pivot pin on No 5 bell but it is acceptable.

8.3 Clappers

All the clappers are of modern spheroidal graphite construction carried on independent crown staples. There was very little wear on any of the strike faces and the clapper pivot bearings were all in good condition. All the clappers are held in place by a crown staple nut located on the top of the headstock. On all the bells this nut was of the 'nylock' type and they were all tight.

8.4 Wheels

The wheels on Bells 1,2, & 5 were in good condition. On Bell No 3 the screw holding the horizontal spoke onto the wheel on the North side is loose. It is advisable to change this screw sooner rather than later as the head will only get worn away with the action of the rope when the bell is being rung full circle. On Bell No 4 there is a similar problem with one of the lower spokes (with bell in down position)

8.5 Ropes

All ropes show signs of wear but are serviceable. **NOTE** If the bells are to be rung from the ground floor then the existing rope lengths may be inadequate. At present the ropes are 'drawn' on Bells 2 and 4 and all the ropes are encased in boxes.

8.6 Pulleys

All the pulleys are of the type where the wheel is supported on a centrally mounted single bearing which allows the pulley to rock from side to side when worn and jam against the side wall. This exacerbates rope wear as the rope is passing over a stationary piece of wood for part of the cycle. All the pulleys are of the wide throat type which allow the sally to pass through.

No 1 bell double pulley showing signs of the above but serviceable.

No 2 bell double pulley OK

No 3 bell double pulley. Both wheels are now free to rub against the side wall and this pulley should be replaced or attention given to both bearings.

No 4 bell double pulley same condition as that fitted on No 3

No 5 bell double pulley some bearing wear apparent but both wheels are free running.

9.0 Ground Floor ringing

When the bells are rung from the ground floor it is essential that

- a. the rope circle is improved
- b. the noise level when all the bells are being rung full circle is in the order of 70dB(A)

9.1 Rope circle (figures 5 & 7)

Figure 5 shows the ringing circle if there was no change to the pulley positions or 'draws' on Bells 2 & 4 and the ropes were extended down to ground floor level.

Figure 6 shows the improvements to the ringing circle that could be made by altering the pulley and 'draw' positions.

9.2 Noise levels (Figure 6)

Each bell was rung in turn from the present ringing room and the following table shows the actual readings at ground floor level with the bell chamber door and fire door at ground floor level open and shut The readings were as follows with the meter on 'slow' and 'A' weighting

Bell No	Bell Chamber & Fire Doors OPEN (hand/backstroke)	Bell Chamber & Fire Doors SHUT (hand/backstroke)
1	68/66 dB(A)	54/52 dB(A)
2	68/67 dB(A)	54/52 dB(A)
3	70/69 dB(A)	58/56 dB(A)
4	74/74 dB(A)	57/56 dB(A)
5	70/71 dB(A)	56/58 dB(A)

To maintain satisfactory voice communications between ringers and remain within legislative guidelines on sound levels, 80 dB(A) is the absolute maximum that is considered tolerable in ringing rooms for general ringing. The target is 10 dB(A) less than this, specifically to achieve ringing room sound levels for each bell of between 68 and 72 dB(A) with ideally no more than 3 dB(A) spread between all bells. As can be seen the sound levels with the doors shut are below the recommended levels. At present although readings were not taken it is thought that the noise levels in the present ringing chamber will be approaching 80 dB(A) or even higher.

When ground floor ringing is reinstated an increase in noise levels will be attained in the 1st. instance by Phase1 as shown in Figure 6.

- 1.1) The belfry trapdoor is in two halves and one of these should be partially opened and secured in that position.
- 1.2) Remove the ceiling boards and any insulation positioned above them. (The ceiling boards show signs of having suffered water ingress at some time and by removing them the source of this may become apparent.)
- 1.3) Remove the carpet in the present ringing chamber.

A further monitoring of the perceived sound levels at ground floor level will show whether Phase 2 needs to be implemented.

- 2.1) Remove the ceiling boarding and insulation under the present ringing chamber.

10.0 Recommendations.

The following recommendations should be carried out regardless of whether ground floor ringing is implemented or not.

- 10.1 Fit a double fluorescent fitting in the belfry.
- 10.2 The debris should be removed from the bell chamber taking special care to remove that which is lodged between the wooden frame and the stonework.
- 10.3 All the metalwork in the bell chamber should be wire brushed, bolts checked for tightness, and then painted with red oxide paint followed by an undercoat and topcoat.
- 10.4 The wooden frame should be given a wire brushing and then treated with a wood preservative. Special attention should be given to the small area of rot in the lower wooden frame member by the door to arrest any further deterioration.
- 10.5 The loose spokes on Bells 3 and 4 should be secured by either fitting new screws or tightening the existing ones.
- 10.6 The pulleys on Bells 3 and 4 should ideally be replaced.

If ground floor ringing is implemented

- 10.7 Alterations to the ringing circle mentioned by John McCartney in his letter of 19th. September should be carried out.
Figure 7 shows the rope circle that could be obtained assuming that the beams in the present ringing room floor do not interfere with any of the new location holes required for the ropes to pass through. Serious thought should be given to fitting rope guides under the existing ringing room floor as the lateral movement as mentioned by John McCartney in his letter will increase.
- 10.8 Due to the extra distance from the ringing position to the wheels it is thought that the existing ropes will not be long enough. There are three options
 1. Purchase new ropes.
 2. Make enquiries into obtaining second hand ropes.
 3. Splice an extra length onto the existing ropes.

10.9 To increase the noise levels carry out the proposals discussed under Section 9.0

11 Conclusions.

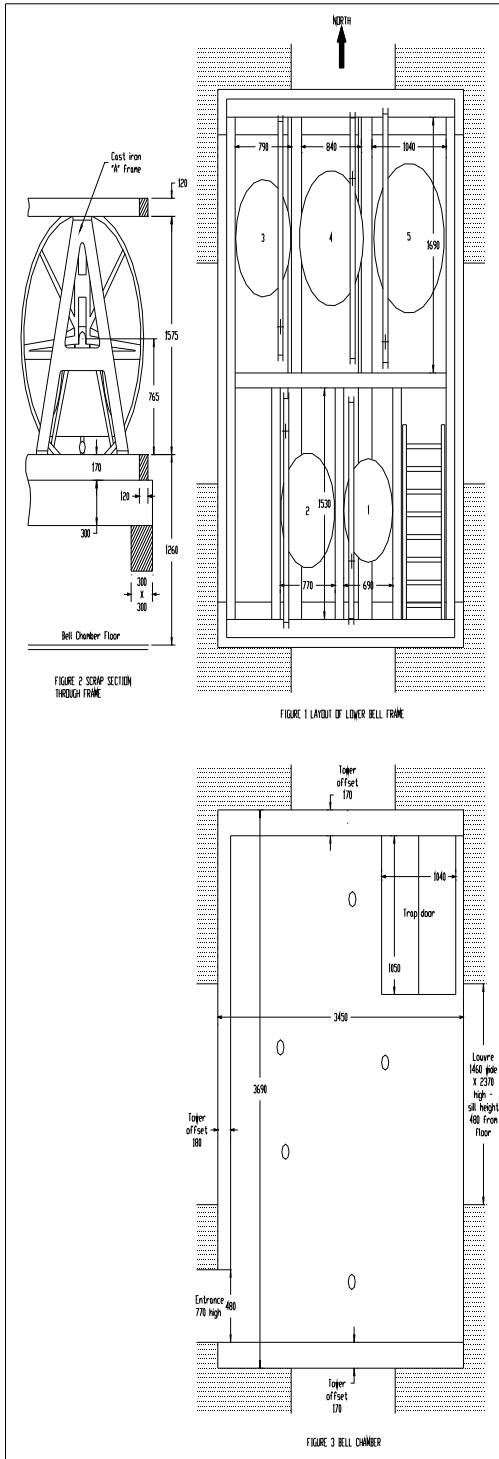
Although costs in reverting to ground floor ringing will be incurred the benefits are as follows.

- Obviate the need to climb the spiral staircase.
- A chance to improve the ringing circle.
- Control the sound of the bells as heard by the ringers to an acceptable level
- Chance to inspect the ceiling dampness in the existing ringing chamber.

NB Advice given free of charge and in good faith but no liability accepted.

R.W. Lyon

Bell Consultant to the Derby Diocesan Association of Churchbellringers



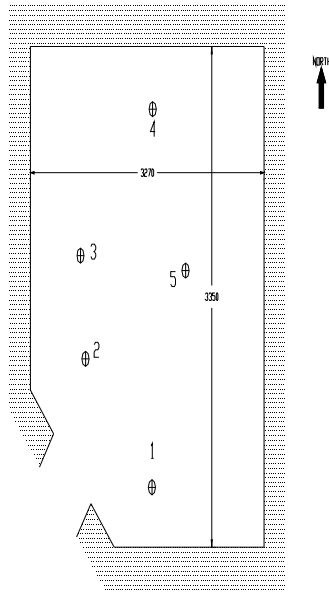


FIGURE 4 PINGING ROOM

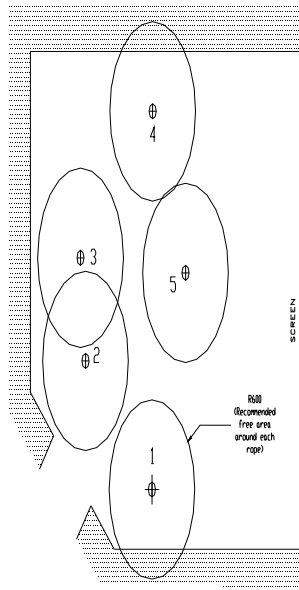


FIGURE 5 GROUND FLOOR Existing rope circle transposed to ground floor

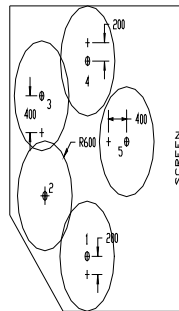
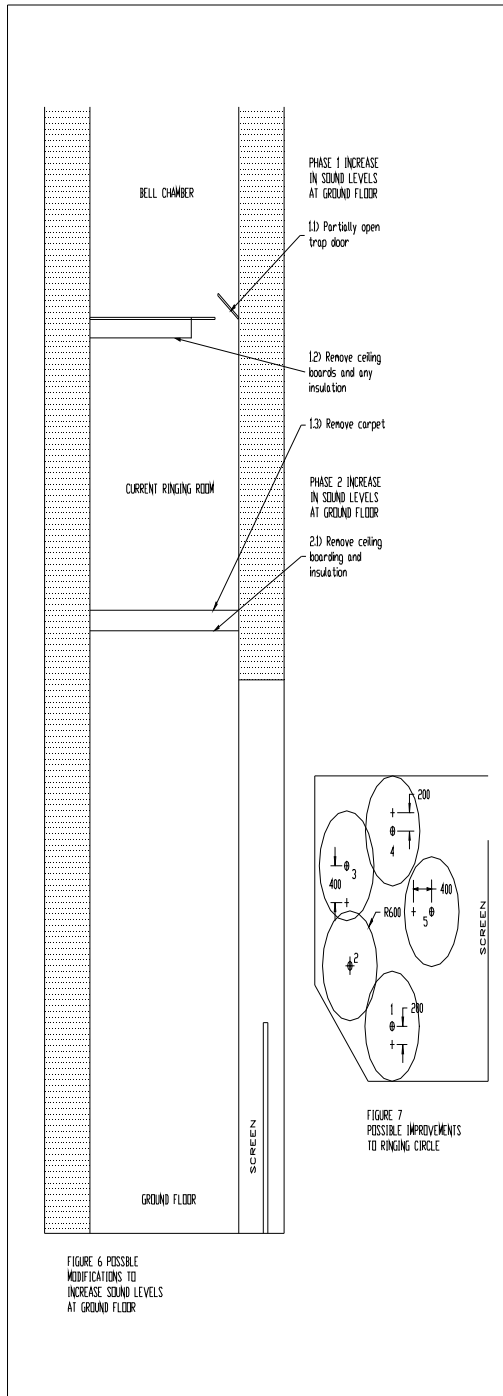


FIGURE 7 POSSIBLE IMPROVEMENTS TO RINGING CIRCLE