

Derby Diocesan Association of Church Bellringers Consultant's Report	Report DDACB 06/07
Church of All Saints', Breadsall Inspection of Bells	Issue Date 09/11/07

1.0 Introduction

The inspection was requested by Mr. C. Prior on behalf of the PCC and was carried out by Mike Banks and Robin Lyon on Thursday 1st. November 2007

2.0 General

The eight bells, none of which is listed, are housed in a tower at the West End of the church. The stone tower is of substantial section and appears in good repair having been rebuilt after a fire in 1914. There are clock faces to the South and West walls below the louvres at the bell chamber level. There are four spire lights near the top of the octagonal spire and four louvred openings positioned lower down.

A door in the West wall allows access to a spiral staircase in the South West corner of the tower. The ringing room is reached by climbing up 26 steps and the bell chamber is reached by continuing up the spiral staircase for a further 34 steps. The bells are rung regularly for church services and weddings.

3.0 Ringing Room (figure 1)

Reached by a spiral staircase. The 24 stone steps are in good repair and access to the door of the ringing room is on the left-hand side. The room, almost square in section is reasonably clean and illuminated by two separate fluorescent lights. The wooden floor is carpeted. Natural daylight enters the area through the windows on the North and South walls.

The clock case and mechanism is mounted on a Rolled Steel Joist (RSJ) which is tied into the North and South walls 750 mm. from the West wall. The bottom face of the RSJ is 2340 mm above the floor which in no way impedes the ringing of the eight bells, the ropes of which fall in an acceptable ringing circle. Bell 6 is the service bell and a hole is correctly positioned in the floor through which the extension rope passes freely.

The ceiling (of concrete construction) height is 4280 mm. which is safe in the event of a ringer being carried up following the breaking of a stay. In the centre of the ceiling is a large trapdoor through which the bells could be lowered.

The tower has a crack running from the top of the 'nave' window up the wall across the concrete ceiling to one side of the trapdoor opening and down the West Wall. There was no evidence of this crack continuing upwards in the bell chamber or below the ringing chamber floor level.

4.0 The Bell Chamber (figure 2)

The Bell Chamber is reached by climbing a further 34 steps. Entry is through a wooden door which is normally locked, with a key kept in the ringing chamber. The area is illuminated by a single fluorescent light and a single incandescent lightbulb. The eight louvres (two on each aspect) have all been bricked up to a height of 1360 mm. above the top of the bell frame leaving an 'open' space of 1280mm. to the top of these louvres. All the louvres in the spire appeared to

be well protected by galvanised mesh and there was no sign of bird ingress. The small amount of bird droppings found appeared to have come from birds nesting higher up outside the octagonal spire.

The concrete floor and beams of substantial section appeared in good condition and there was no sign of the crack noticed in the ringing room ceiling. The wooden trap door is located under bells 4 and 8 and covered with a sheet of polythene. Wooden grillage beams rest on these concrete beams and are set into the walls of the tower on the North and South aspects. The mechanism for the South facing clockface is located on the floor under Bell 1 in a box of brick construction with a loose fitting wooden lid. The West facing clockface mechanism is located under Bell 3. The brickwork on this box is in need of attention as one corner has collapsed and the wooden lid is in danger of resting on the input shaft.

5.0 The Bells

All eight bells are hung for full circle ringing. All the bells are hung 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	Date (approx)	Founder
1	660 (26)	4-0-20	1973	Whitechapel
2	676 (26.625)	4-1-14	Recast 1908	
3	699 (27.5)	4-1-08	1920	
4	749 (29.5)	4-3-20	Recast 1916	
5	813 (32)	6-0-10	Recast 1916	
6	864 (34)	7-1-00	Recast 1916	
7	953 (37.5)	9-2-05	Recast 1916	
8	1105 (43.5)	14-0-05	Recast 1916	

All the bells show little sign of 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. Clock hammers are fitted to strike bells 4,7, and 8

6.0 Bell Frame

Of wooden construction the frame appears to be in excellent condition, securely fixed to the grillage beams and with no signs of any rot or insect attack. There is ample height between the concrete floor and the underside of the frame for the two clockface gearbox housings to be located without interfering with the ringing of the bells full circle. There is however some dry debris between the outer edges of the frame and the walls. This should be removed

7.0 Bell Fittings

7.1 Headstocks

The metal headstocks all appeared to be in excellent condition. The bells are connected to the headstock by four bell-holding bolts with the head of each bolt being within the bell. All the bolts appeared tight.

7.2 Bearings

All are self-aligning ball bearings with no sign of lubricant loss from the shaft seals. (It should be noted that the bearings are sealed for life and under no circumstances should they be regreased). Ball bearings tend to last a very long time in this sort of application with the added bonus that eventual failure is benign. Their condition can only be properly assessed following a full strip down however a rough check was carried out by feeling each bearing for 'rumble' whilst the bell was swung through a small arc. No obvious defects were observed or felt.

7.3 Gudgeon Pins

These are the supporting pins that project either side of the headstock into the bearing housings. All appeared to be tight with no sign of loosening.

7.4 Clappers

The clappers on bells 1, 6, and 7 are OK.

On bell 2 the clapper appears tight but the head of the holding bolt that secures the clapper in the forked section is not hard up against the shoulder. The pin that holds the pivot bearing in place appears to be missing.

On bells 3,4, and 5 the pivot bearing requires greasing

On bell 8 the clapper is tight but appears to be swinging 'out of line' when viewing the strike point contacts on both sides of the bell (handstroke and backstroke)

7.5 Stays and Sliders

All the stays are OK apart from bell 5 where one of the bolts is missing.

The sliders on bells 1,2,5,6, and 8 are OK.

The sliders on bells 3 and 4 are worn to around half their original thickness where they come into contact with the fixed rail. and should be replaced soon.

On bell 7 the slider is not sitting down correctly on its pivot point. The hole in the slider should be enlarged thus allowing the slider to take up its correct position.

7.6 Pulleys

On bell 1 the single nylon pulley is serviceable.

On bell 2 the double nylon pulley is serviceable although one of the pulleys is grooved.

On bells 3, 4, 5, 6, and 7 the single wooden pulleys needs replacing. It is possible to 'lock' the pulley to one side which means that when the bell is being rung full circle there is additional friction between the rope and the pulley thus causing wear to both.

On bell 8 the double wooden pulley should be replaced.

7.7 Wheels

All the wheels appeared to be in good condition.

7.8 Ropes

All the ropes are serviceable but showing signs of wear where the rope passes through the garter hole. It would be of great benefit to present an unworn section of rope to this position by raising or lowering the ropes by a few inches.

7.9 Clock hammers

The shaft that supports the clock hammer striking bell 8 is not correctly located in its bearings and the hammer has been displaced from its correct position. This should be attended to with some urgency.

It was also observed that when being rung full circle bell 8 is rubbing against the wood supporting the striking mechanism for bell 4. This contact point should be relieved.

8.0 Recommendations

1. The shaft supporting the clock hammer on bell 8 should be repositioned correctly as soon as possible. A great deal of damage could be done to the bell and bell fittings when being rung full circle if the clock hammer is dislodged further.
2. The pulleys on bells 3,4,5,6,7 and 8 should all be replaced. This will help in prolonging the life of the ropes and improve the 'go' of the bells.
3. Grease clapper pivot bearing on bells 3,4, and 5.
4. The nut and bolt assembly passing through the pivot bearing on the clapper fitted to bell 2 should be checked for tightness. There must be some reason as to why the head of the bolt is not hard up against the shoulder of the fork section. The missing pin that locates the bearing bush should also be replaced. It may be easier to do with the clapper removed from the bell.
5. Check the centralisation of the clapper on bell 8
(See separate section for instructions on how to check and remove clappers)
6. Replace sliders on bells 3 and 4.
7. Enlarge the hole in the slider for bell 7. This will allow the slider to sit down in its correct position.
8. Fit new holding bolt on stay fitted to bell 5. Making sure that the coach bolt head locates on the wooden stay itself and NOT on the metal socket.
9. Raise/lower all the ropes to present a relatively unworn part of the rope to the wheel at the garter hole position. This should prolong the life of the rope by an appreciable amount of time. There is no recognised additive that can be used to prolong the life of a hemp rope.
10. All the bell holding bolts, wheel fixings, and frame holding bolts showing signs of rusting should be wire brushed and/or scraped to remove the loose rust and then repainted using either two coats of 'Hammerite' or one coat of metal primer, one coat grey undercoat, and one top coat of gloss
11. The dry matter trapped between the frame and the walls should be removed
12. Treat the frame and wheels with a coat of 'Cuprinol' wood preservative.
13. Carry out repairs to the brickwork box that houses the gearbox mechanism for the clock on the West face (located under bell 3).
14. Plane or chisel some wood from the support structure for the clock hammer on bell 4 to give clearance for full circle ringing of bell 8.

Procedure for removal, refitting and tightening of clapper in the headstock

The following operation should be carried out by two people with the bell in the 'down' (at rest) position.

Remove the old split pin which passes through the castellated nut on the headstock. One person should now lie under the bell and hold the clapper against the sound bow at the centre of the strike point. Using a suitable spanner the castellated nut can now be slackened by the other person. (The application of some easing oil to the threaded section prior to removal of the nut is recommended). The person under the bell should now take the full weight of the clapper allowing the castellated nut and washers to be removed completely from the threaded section. The clapper assembly can now be lowered making sure that the leather washer fitted under the square section of the shaft is still in place.

Refitting is carried out by guiding the threaded section complete with leather pad up through the square section hole through the bell. Holding the clapper against the strike point the washers and nut can be run down the threaded section of the crown staple until the whole assembly is tight. The person underneath can now check that the clapper is hanging centrally. One of the slots in the castellated nut should now be lined up with one of the holes drilled through the threaded section and a new split pin fitted

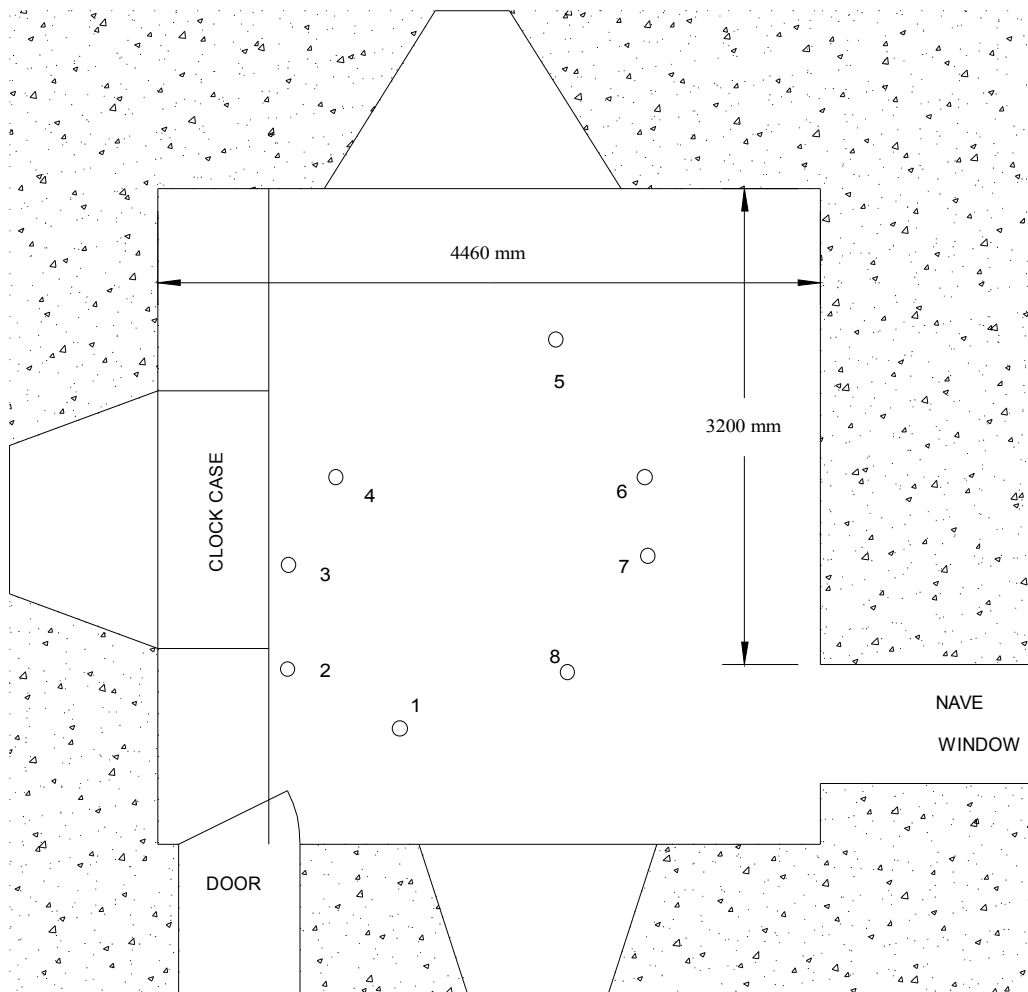
On bell 8 it is recommended that the clapper is not completely removed but the castellated nut is slackened off allowing the clapper to be moved freely within the square section hole in the bell. The person under the bell can then hold the clapper against the centre of the strike point and the castellated nut tightened down. The clapper should then be checked to see that it is striking both sides of the bell in the mid point of the worn area, and a NEW split pin fitted. If it does not then the clapper should be completely removed, rotated through 180 degrees, refitted and the alignment checked again.

9.0 Conclusions

Although the cleaning, painting, brickwork, and some of the other required work can be undertaken on a DIY basis you may feel happier using the services of a professional bell hanger and clock specialist. Attached to this report please find the name and addresses of three bellhangers and two clock specialists who would be willing to undertake the work.

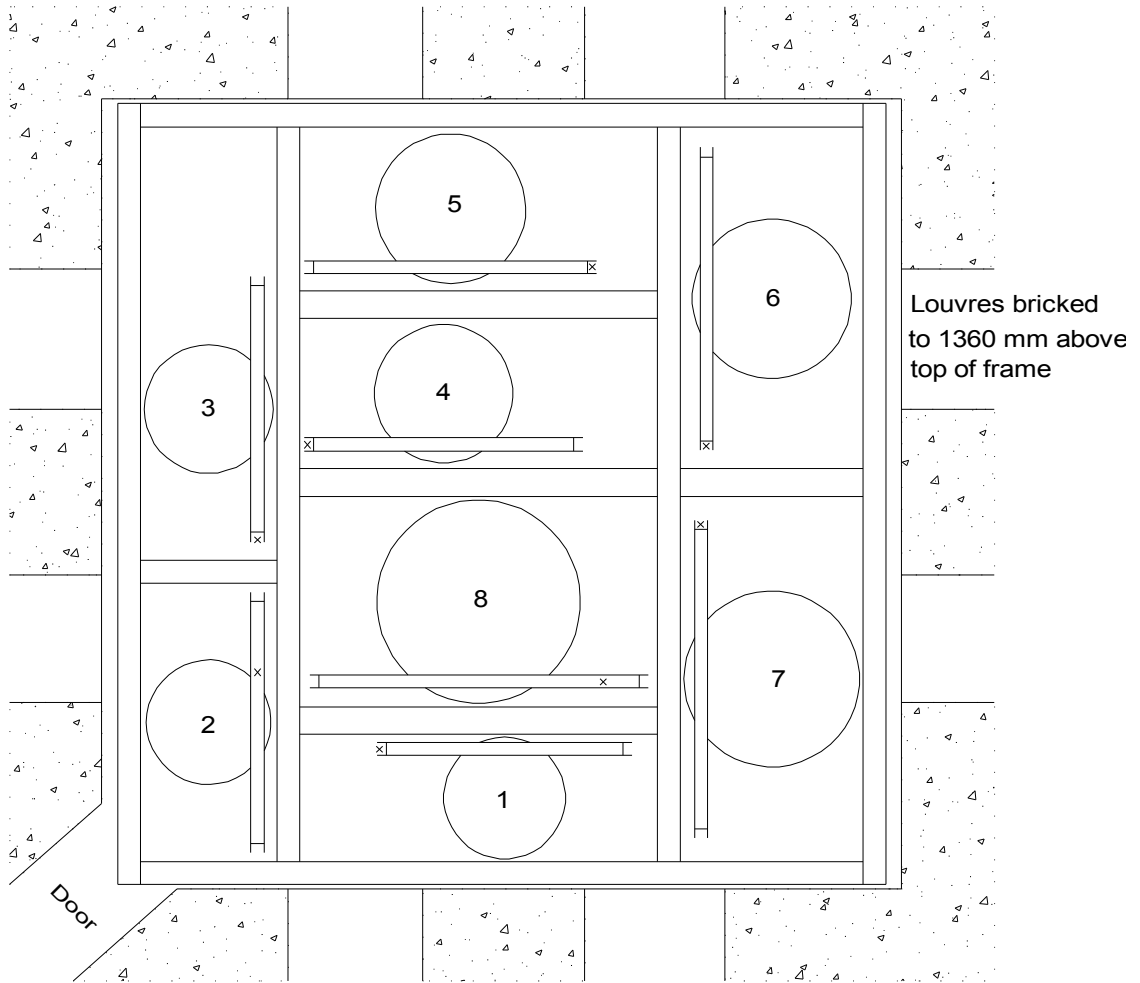
Advice is given in good faith but no liability is accepted.

Robin Lyon
Bell Consultant to the Derby Diocesan Association of Church Bellringers.



RINGING ROOM

Figure 1



BELL CHAMBER

Figure 2