

Derby Diocesan Association of Church Bellringers Consultant's Report	Report DDACB 02/06
Church of St. Michael and All Angels, Alvaston Inspection of Bells	Issue Date 18/02/06

1.0 Introduction

The inspection was carried out on 3rd. February 2006 by Mike Banks and Robin Lyon, Bell Consultants to the Derby Diocesan Association of Church Bellringers. The inspection was requested by Lorraine Rawlings, Secretary to the PCC.

2.0 General

The six bells are housed in a tower at the West end of the church. The tower appears to be of sound stone construction with no obvious signs of structural weakness. There is a single clock face on the West wall. Ringing is carried out from a ringing room accessed by a door on the North East corner and a flight of steps. The ringing room houses the tower clock and the weight box. The bell chamber is reached by climbing a wooden ladder on the East side of the ringing room and through two trapdoors, one at the ceiling level of the ringing room and the other at floor level of the bell chamber. Up until a few years ago the bells were rung for Sunday service and very rarely for practice nights. There is now an active group of ringers and the bells are being rung both for services and practice nights.

3.0 Ringing Room

Reached by a spiral staircase. The 34 stone steps are in good repair. The room, almost square, is clean and illuminated by a single fluorescent light fitting suspended from the ceiling. For safety reasons it is good practice to have a twin tube installation to guard against loss of light in the event of a tube failure during night time ringing. The wooden floor is in excellent condition - and fitted with a square trapdoor which was obviously used for the raising of the bells prior to installation in the H type frame. The ropes fall in an acceptable circle and each bell position is marked on the floor. The clock mechanism is housed in a wooden cabinet on the North wall and the clock weight box is housed in the South West corner. Natural light enters the room through two windows in the North and South walls and through the clock face on the West wall. A small window in the East wall looks down over the nave of the church. The ceiling height is 4.96 metres which is safe in the event of a ringer being carried up following the breakage of a stay. The levers to actuate the striking of the quarters and the hour on bells 1, 2, 3 and 6 are attached to the ceiling but in no way interfere with any of the rope falls.

4.0 Bell Chamber

The bell chamber is reached by climbing the 21 steps on the inclined wooden ladder on the East wall of the ringing room. The ladder is substantial and a handrail is fitted on the open side. The trapdoor at ceiling level is fitted with a padlock. The key, of which, is kept in the ringing room. This trapdoor slides back to reveal a further trapdoor, which slides back to allow access to the bell chamber. The distance between the ceiling of the ringing room and the floor of the bell chamber is just under 0.5 metre. Of nearly square section natural light enters through four louvres, one on each aspect. These louvres are fitted with mesh that is showing signs of deterioration in places but there was no sign of bird ingress. Illumination is provided by a flood type light and a

separate incandescent light. These provide adequate light for movement around the frame. The chamber floor, of wooden construction, appeared to be in good condition with no sign of dry or wet rot. There is, however, a substantial amount of debris on the floor, which should be cleared. A trapdoor was positioned in the centre of the floor but this was underneath one of the grillage beams and it was completely unusable as a means of lowering any of the bells down to the ringing room without first dismantling the frame. There is no corresponding trapdoor in the ringing room ceiling.

5.0 The Bells

All six bells are hung for full circle ringing. Bells 1,4 and 6 are mounted on ball bearings. Bells 2,3 and 5 are mounted on plain 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	749 (29.5)	5-1-22	1894	John Taylor and Co.
2	810 (31.88)	6-2-15	1894	John Taylor and Co.
3	878 (34.56)	8-0-25	1894	John Taylor and Co.
4	929 (36.56)	9-2-5	1894	John Taylor and Co.
5	1030 (40.56)	12-3-10	1894	John Taylor and Co.
6	1159 (45.63)	17-1-3	1894	John Taylor and Co.

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 1,2,3, and 6.

6.0 Bell Frame

The bell frame is of a Cast Iron H type which rests on steel grillage beams that are set into the walls of the tower on the North and South aspects. The top of the frame is keyed into the East and West walls for lateral stability.

There is a clearance of 125mm from the floor to the underside of the grillage beams and there is provision on the frame for the fitting of a further two bells.

Although of adequate size and showing little sign of corrosion it is recommended that the grillage beams and the H frame should be wire brushed by hand, and for particularly bad areas an angle grinder fitted with a wire cup brush should be used. The use of eye and ear protection is essential when undertaking this task and care taken because of the fire hazard. Where bare metal is reached a three-coat paint application should be applied as follows.

- Red Oxide Primer
- Grey Undercoat
- Gloss Top Coat

If only surface rust is removed then a good undercoating followed by the gloss coat will suffice.

7.0 Bell components and fittings

7.1 Wheels

On bells 1,2,3 and 5 the wheels are in good condition apart from the metal fixings which should be wire brushed and painted as detailed under 6.0 Bell Frame.

On bell 4 part of the rim section on the inside edge of the wheel (approx. 2 inches long) is missing. Although not affecting the ringing of the bell full circle this missing area should be replaced.

On bell 6 part of the wheel has become detached from two of the spokes on the headstock side and the sole (on which the rope runs) has split. Several of the spokes have obviously been cut away to avoid contacting the clock hammer when the bell is rung full circle. It is recommended that the clock hammer 'at rest position' is altered (i.e. further away from the bell) and a steel plate is fixed to the bell side of the wheel on each spoke that has been cut away to give extra support. The sole plate should be repaired and the spokes refixed.

7.2 Headstocks

All of cast iron construction and would benefit from rust removal and painting. The bell holding bolts should be checked for tightness, as there appeared to be some slackness on bells 3 and 5.

7.3 Bearings/Gudgeons

Bells 1 and 6.

Mounted on 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). The gudgeons (the supporting pin projecting either side of the headstock into the bearing housing) showed no sign of loosening.

Bell 4

Mounted on ball bearings with no sign of lubricant loss. It appears that a repair has been made at some time to the gudgeon pin on the wheel side and the unpainted bearing on this side leads us to believe that a new bearing was fitted at the time of the repair. Both bearings and gudgeons are OK.

Bells 2 and 5

Mounted on plain bearings. The gudgeon pins appeared in good condition but it is recommended that the housings be very carefully cleaned out. New pads should be fitted over the open section of the pin between the brass bearings and a fresh charge of oil applied.

Bell 3

Mounted on plain bearings. The gudgeon pin on the wheel side is showing signs of working loose. It is possible for a loose gudgeon to fail with serious consequences and in light of this it is recommended that this should be repaired before the situation becomes dangerous. Repair will involve lowering the bell a short distance on to wooden blocks placed beneath, detachment of the wheel and stay, and then removal of the headstock to the bell hanger's workshop. A list of local bellhangers is attached to this report and it is recommended that at least two quotes are obtained. Serious thought should be taken as to replacing the plain bearings by self-aligning ball bearings at this time. This will make the bell easier to ring and no maintenance will be required for several years.

7.4 Clappers

All clappers are made of wrought iron and carried by independent crown staples located through a central hole in the bell and headstock.

Bells 1 and 5

The crown staple nut requires tightening.

Note

The crown staple is tightened by using the following procedure, which should be carried out by two people with the bell in the down (at rest) position.

After applying some easing oil to the threaded section remove the old split pin which passes through the centre of the screwed section rod and the castellated nut on the headstock. One person should now lie under the bell and take the weight of the clapper whilst holding it against the side of the bell at the centre of the strike point. This will resist the applied torque whilst the nut is tightened until the crown staple is tight. After checking with the person under the bell that the crown staple is truly tight one of the slots in the castellated nut should be lined up with the hole drilled through the threaded section of the rod and a new split pin fitted. 'Splay' the ends of the split pin to locate in position. The person underneath should now check that the clapper is hanging centrally and striking the sound bow of the bell on both sides in the centre of the worn section. Any 'play' up, down, or sideways felt by moving the clapper should be in the pivot bearing only.

Bells 3 and 4

The clapper pivot bearings are badly worn and need rebushing.

Bell 2

The clapper pivot bearing is badly worn and needs rebushing. There is also very heavy wear on the clapper face.

Bell 6

The split pin is ineffective, as it is not located through the castellated nut.

7.5 Stays and Sliders

All the sliders are made of steel running on a rail firmly fixed to the frame. Although they all operate correctly it is recommended that all the steel is cleaned and a new charge of oil applied to all the surfaces once the floor area has been cleaned, New leather 'buffer' strips should be fitted at the end of each rail.

Bells 1 and 3

The stays are OK.

Bells 2, 4 and 6

The holding bolts for the stays should be checked for tightness.

Bell 5

The top holding bolt is tight but the lower bolt does not pass completely through, what appears to be a hardwood stay. It is recommended that this hardwood stay is replaced by a conventional ash one and two new bolts are fitted. The purpose of the stay is to 'park' the bell on hand and backstroke when the bell is raised. It is felt that the hardwood stay may not break in the event of the bell being overpulled and damage may be caused to the bell and/or its fittings.

7.6 Pulleys

All the pulleys, although showing slight signs of wear, were in acceptable condition.

7.7 Ropes

All the ropes were serviceable but the leather sleeves, fitted over the rope where it passes through the garter hole on bells 2,3 and 6 should be replaced. The leather on bell 6 had actually collapsed and was firmly wedged in the garter hole.

8.0 Clock Hammers

The clock hammer on bell No 1 misses the hold off spring and actually rests on the bell when the clock hammers are in the 'on' position. This is due to lateral sloppiness on the square shaft and a metal spacer should be fitted on the shaft to hold the clock hammer in a position where it will always fall onto the spring. Bell metal is very brittle and the bell needs to return to its normal 'silent' state without any 'foreign' object (e.g. clock hammer) being in contact with it.

On Bell No 6 one of the clock hammers is not held captive on its support and although unlikely to fly off due to its weight some form of holding device should be fitted.

9.0 Recommended Actions

9.1 Work generally requiring involvement of professional bell hangers.

- Retightening of the 'loose' gudgeon pin on bell no 3. Serious consideration should be given to replacing the plain bearings, not only on this bell but also on bells 2 and 5, with self-aligning ball bearings at the same time.
- Repair sole plate and refix spokes on wheel fitted to bell 6.
- Rebushing of clappers 2,3 and 4
- Reface the strike faces of clapper 2.

9.2 Work that could be undertaken in house.

- Replace the single fluorescent light assembly in the ringing chamber by a double one.
- Sweep out bell chamber and remove all debris from the area.
- Replace the existing mesh in the louvres by 'Galebreaker'. Galebreaker is a strong PVC coated woven polyester sheet with closely spaced tiny holes. Placed up against the inside of the louvres it stops the birds and rain getting in whilst still allowing ventilation and readily transmits sound. (Sample enclosed)
- Wire brush and paint all metal work in the bell chamber. i.e. frame, headstocks, bell holding bolts and wheel fixings.
- Replace the missing part of rim on wheel of bell 4. It is recommended that this be glued and screwed in place.
- Check tightness of bell holding bolts on bells 3 and 5.
- Clean out, fit new pads, and recharge with new oil the plain bearing assemblies on bells 2 and 5 if not to be replaced.
- Tighten crown staple nut on bells 1 and 5 using the procedure described under Section 7.4
- The split pin fitted to the crown staple on bell 6 should be removed. The crown staple should then be checked for tightness (see Section 7.4) one of the following methods should now be used to secure the assembly. 1. Drill a new hole through the screwed rod section and fit a new split pin, or 2. Replace the castellated nut with a 'nyloc' type.

- The steel sliders should all be cleaned and lubricated with new oil. Missing leather buffer strips should be replaced.
- Tighten stay holding bolts on bells 2,4 and 6.
- Remove the existing stay on bell 5 and replace with one made from ash and fit two new holding bolts.
- Replace leather sleeves on ropes fitted to bells 2,3 and 6.
- Fit metal spacer to shaft that supports clock hammer fitted to bell no 1.
- Fit some form of holding device for clock hammer on bell no 6.

10.0 Conclusions

Removal of any large item from the bell chamber would have to be through the louvres, which could prove a difficult and costly exercise. In view of this difficulty it is in the interest of all parties to make sure that the bells and associated fittings are maintained in good working order. The repairs to the gudgeon pin on bell 3 and the wheel repair on bell 6 should be carried out before there is a complete failure.

There is no reason why future generations should not enjoy the bells if the remedial actions outlined above are carried out.

If the cost of the work exceeds £1,000 you may wish to apply for a grant and /or loan from the bell repair fund. It must be stressed that applications for the above can only be considered for schemes of work that are proposed. No consideration can be given to applications after contracts for the work are placed.

The Education Committee (DDACB) run courses primarily aimed at those responsible for maintaining the bells and fittings.

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

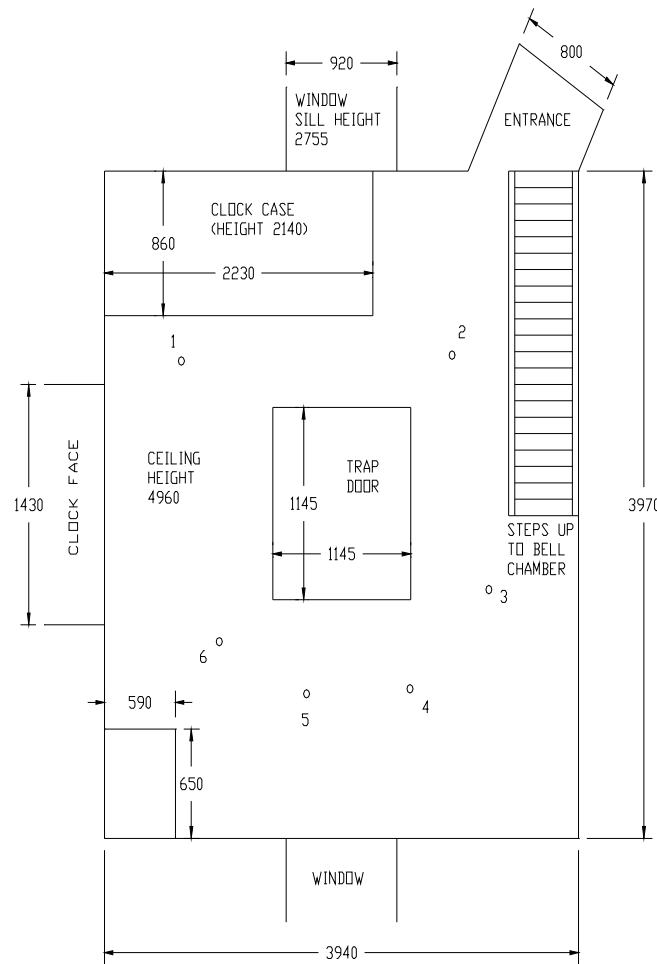
Robin Lyon
Bell Consultant to the DDA

CONTACT DETAILS FOR LOCAL BELLHANGING COMPANIES

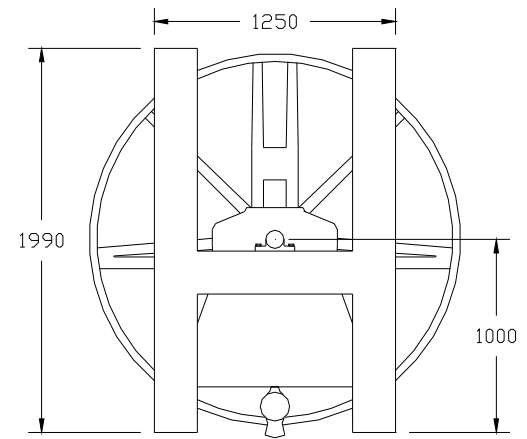
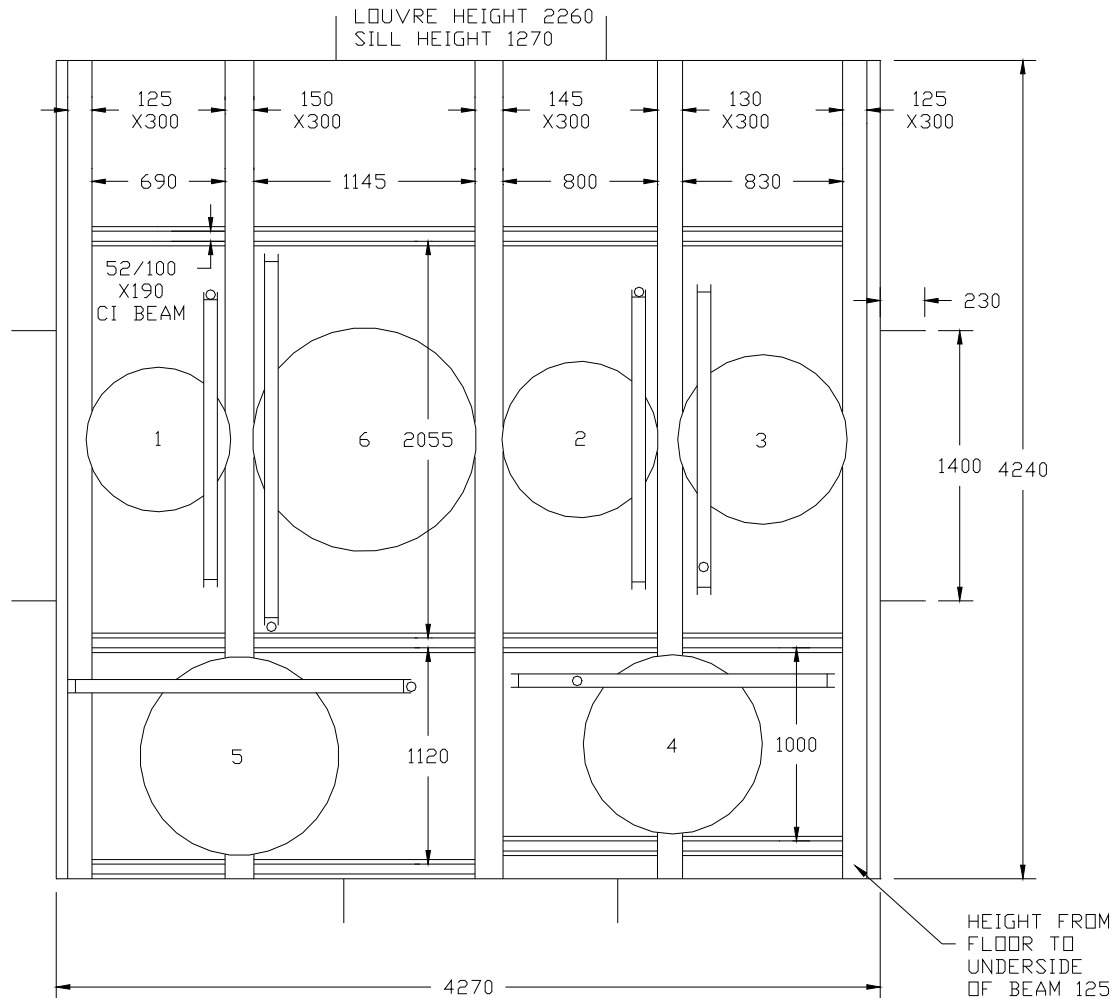
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RINGING ROOM LAYOUT



TENDON "H" FRAME

BELL CHAMBER LAYOUT