

**REPORT ON THE BELL INSTALLATION
AT THE CHURCH OF ST. GILES,
OXFORD.**

20th September, 2007



**ALL RECOMMENDATIONS GIVEN IN THIS REPORT ADHERE TO
THE 1993 CODE OF PRACTICE FOR THE CONSERVATION
OF CHURCH BELLS AND BELL FRAMES
ISSUED BY THE COUNCIL FOR THE CARE OF CHURCHES**

A FACULTY MUST BE OBTAINED BEFORE ANY WORKS COMMENCE

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The western tower contains a Ring of **EIGHT** bells in the key of F[#] plus ¹¹/₁₀₀ of a semitone, detail as follows:-

<u>BELL</u>	<u>DIAMETER</u>	<u>DATE</u>	<u>FOUNDER</u>
Tenor	3'- 6 ⁹ / ₁₆ "	1632	Ellis Knight I
7th	3'- 2"	1850	William Taylor
6th	2'- 11 ⁵ / ₈ "	1850	William Taylor
5th	2'- 9 ⁹ / ₁₆ "	1850	William Taylor
4th	2'- 7 ⁷ / ₁₆ "	1850	William Taylor
3rd	2'- 5 ⁷ / ₈ "	1850	William Taylor
2nd	2'- 3 ¹ / ₂ "	1927	Mears & Stainbank
Treble	2'- 2 ³ / ₄ "	1927	Mears & Stainbank

BELLS

None of the bells are listed in the Council for Care of Churches "Schedule of Bells for Preservation" in the Oxford Diocese.

With the headstocks in place, no cracks are evident. Most of the bells have a layer of corrosion scale, giving the bells a rough appearance.

The canons remain on the 6th, 5th, 4th and 3rd bells but have been removed from the tenor and 7th. The treble and 2nd were cast without canons. All bells are well worn in the soundbow from the blows of their clappers.

The tenor is a maiden bell, not having been tuned. The 6th, 5th, 4th and 3rd have been chip-tuned. The 7th remains un-tuned but has had its lip cut back (skirted) in an attempt to raise the pitch of its strike-note. The treble and 2nd have been machine tuned.

The bells are not at all well in tune and the overall tonal quality of the ring is generally only fair. Using the nominal of the tenor as the datum (745hz.) and just intonation, the deviation of the nominals of the other bells are such that the 7th is 6.63hz. flat, the 6th 5.75hz sharp, the 5th 23.67hz sharp, the 4th 25.5hz sharp, the 3rd 28.83hz sharp, the 2nd 11.13hz sharp and the treble 36.50hz sharp.

BELLS (Contd.)

The complete table of principle partials are as follows:-

BELL	HUM	PRIME	TIERCE	QUINT	NOMINAL	NOTE
	Cycles per second (Hz.)	Cycles per second (Hz.)	Cycles per second (Hz.)	Cycles per second (Hz.)	Cycles per second (Hz.)	+/- cents
Tenor	187	369	450.5	543	745	F# ⁽²⁾ +11
7th	218	391	495.5	648	831	G# ⁽²⁾ +0
6th	253	455	570.5	763	937	A# ⁽²⁾ +8
5th	285.5	474	620.5	839	1017	B ⁽²⁾ +51
4th	308	538	690	990.5	1143	C# ⁽³⁾ +53
3rd	341.5	552	760	1011.5	1270.5	D# ⁽³⁾ +35
2nd	394.5	661	853	1177.5	1408	E# ⁽³⁾ +13
Treble	415	740.5	934.5	1128.5	1526.5	F# ⁽³⁾ +53

BELL FRAME

The timber bell frame containing the six larger bells was constructed by F. White in 1907 and this was enlarged to eight pits by the addition of cast-iron frame sides by R. White in 1927.

Each timber frame section consists of a top and bottom sill and two opposing diagonal braces.

The frame is now supported by a double-depth girder grillage, installed by our company in conjunction with the Company of the late Frederick Sharpe (Lewis Penn) in the 1960s.

The ropes fall in a clockwise circle within the frame the layout being such that bells treble and 2nd swing mouth to mouth east-west on the north side of the chamber, bells 7th, tenor, 4th and 3rd swing sided by side north-south in the centre of the chamber with the 6th and 5th swinging mouth to mouth east-west on the south side of the chamber.

The timber frame is fitted with vertical tie-bolts and angle plates and the frame as a whole is in excellent order.



A view of the bell installation. (The 5th wheel is in the foreground)

RINGING FITTINGS

These are as follows:-

Headstocks & Bearings

The treble and second are fitted with cast-iron headstocks and fixed steel gudgeons, the remainder being fitted with elm headstocks and cast-iron gudgeon plates.

There is evidence that the headstocks of the back six have warped and twisted, meaning that the bearings are no longer exactly in line with each other.

The ball bearing units were fitted in the 1970's by our Company.

Supporting Ironwork

The treble, 2nd, 7th and tenor bells are supported by four bolts through the crown of each bell and bells 3rd, 4th, 5th and 6th with traditional supporting straps, copses and canon brackets.

Clappers & Staple Units

The clappers are all of wrought-iron with eye-tops apart from the 7th which is of S.G. cast-iron. The bushes of the treble and 2nd are very worn.

The clappers are suspended from independent fabricated steel staples.

Wheels

These are of oak with elm & ash and all wheel centres are in fair condition. All rims are in average condition. The wheels are fitted with rod-braces. Ropes fitted to the bottom of the wheels may be contributing towards deadening the sound of the bells. If used to tie clappers, these ropes can also pull the wheels out of true alignment as well as straining the wheel horizontally.

Pulley Units

All are of timber with timber sheaves revolving on nylon bushes and fitted with greasing units.

Stays, Sliders and Runner Boards

The stays and sliders are all of ash, the 7th stay being of the curved type. The runner boards are of deal with end stops.

Bellropes

All flax bellropes are in fair to poor condition.

Clock Hammers

No clock hammers are fitted.

RINGING FITTINGS (Contd.)



The 4th bell and its fittings



The tenor bell and its fittings.

TOWER

The western tower is constructed of stone and is divided into four levels:-

- Ground floor organ loft, some 23'- 11" high.
- First floor ringing chamber, some 13'- 6" high.
- Second floor clock chamber, some 4'-10" high
- Third floor bell chamber, some 9' 7" from the top of the bell frame to the lifting girder.

Access to all levels is by timber and metal ladders.

There is electric lighting in all upper chambers.

There are bell traps in all floors.

CONCLUSIONS

The bells are very much out of tune with each other with bells five to treble in particular being excessively sharp. The ring could be greatly improved using modern tuning techniques.

The bell frame is of good design and in excellent condition.

The "go" of the bells could be greatly improved if hung on new fittings.

RECOMMENDATIONS

TOWER

All bell traps should be checked for ease of lifting. (Please see the note at the end of this report).

BELLS

All bells should have the centre hole in their crown enlarged to facilitate clapper adjustment. As much as practicable of the iron left in the crown of those bells which originally had cast-in staples should be removed to relieve stress caused by the expansion of the corroding wrought iron within the brittle bell metal

Carefully remove the canons from the crown of the 3rd, 4th, 5th and 6th bells.

Re-tune the bells at the Whitechapel Bell Foundry.

Cast a resin pad on the crowns of bells 3rd to tenor to receive cast-iron headstocks.

Drill the crowns of all bells to suit their new headstocks.

When rehung all bells should be turned to present an unworn surface to the blows of their respective clappers.

BELL FRAME

Check over and tighten, as required, all frame ironwork.

RINGING FITTINGS

These should be renewed for full-circle ringing as follows:-

Cast-iron box-section headstocks with fixed steel gudgeons, heavy duty double row self-aligning ball bearings in totally enclosed dust-proof housings and adjustment screws to facilitate the setting and maintaining of even clapping.

Insulation pads for fitting between bell and headstock.

Steel supporting bolts, nuts, locknuts and insulation washers.

Independent crown staple units, each fitted with a "maintenance free" stainless steel clapper pin.

RINGING FITTINGS (Contd.)

Spheroidal Graphite clappers with octagonal flights, each with a resiliently-mounted machined Tufnol bush at its point of swing.

Adapted and re-rimmed existing wheels each fitted with two steel angle braces.

Hardwood pulley units each with sheaves running on two "sealed for life" ball races.

Slider pins with facilities to prevent the sliders from "lifting".

Dry ash stays and sliders and hardwood runner boards.

A set of eight best quality flax bellropes with close woven pure wool sallies and. pre-stretched terylene top-ends.

All timber fittings should be treated with insecticide and all metal ringing fittings painted with three coats of high quality exterior grade paint.



The proposed design of cast-iron headstock.

N.B.

We strongly recommend that the bells are re-tuned and note that the removal of the bells from the tower, which would be essential if the bells are to be re-tuned, would only be possible if some of the organ pipes were temporarily removed from the northern tower archway. A scaffold would also have to be constructed to carry the bells over the recently built screen on the north side of the church, the doorway in the screen not being wide enough for the larger bells to pass through.