Belfry Maintenance Check List

SAFETY

- Do not work alone in the belfry.
- Ensure that someone else knows you are in the belfry and how long you are likely to be there.
- Always leave a warning notice in the ringing room.
- Never work on bells which are up.
- Ensure all lights are working and you have sufficient light to work safely.
- Disable any clock chimes to save a loud surprise later.
- Wear appropriate PPE.

Record all actions taken and observations made in your Belfry Maintenance Book and inform the authorities (custodians of the bell tower) of any issues.

ROPES

Check for wear on all the ropes:

- At the garter hole (where the rope passes through the wheel)
- Wherever the rope runs over pulleys
- Where the rope runs through any bosses or floors and the tail end where it hits the floor.

If the rope is worn down to half its original diameter, it is frayed, or if the different strands are not visible, it needs changing or splicing.

When a different rope needs fitting tie the top of the new rope to the bottom of the old one and pull it up holding the new rope at the correct height.

MAIN BELL BEARINGS

For plain bearings:

- Lightly lubricate the main bearings with castor oil if you can get it, if not, use gearbox oil.
- Do NOT use car engine oil – it contains detergents that attract moisture and can cause pitting on the steel gudgeons.
- Preferably there should be a felt pad on top and pressing down on the gudgeon to retain the oil.

For ball bearings:

- Enclosed ball bearings do NOT generally require any lubrication or maintenance.
- Adding excessive grease to a bearing housing will break the seal around the gudgeon, allowing grit and dirt to enter the housing.
- If the bearing makes a noise when the bell is gently swung without it striking, the chances are the ball race is breaking up and will need replacing.

PULLEYS

- Check that pulleys spin freely and are not deeply grooved, or oval (if wooden).
- They should make little or no noise when spun by hand. Noise implies that the bearings are worn.

CLAPPERS

- Check that all the clapper assemblies are tight in the headstocks and the locking mechanism (split pin or lock nut) is in place.
- Check that the clapper swings freely and is correctly aligned so that it swings at exactly 90 degrees to the line of the bearings.
- Check the amount of sideways and vertical movement.
- If there is more than 25mm of sidewise movement the clappers may need re-bushing.
- Where the headstock has ‘twiddle pins’ (clapper adjusting bolts, more properly known as hexagonal headed set screws) screwed into the headstock one of these should be loosened on the headstock to allow the clapper to be tightened and then ‘pinched’ tight again afterwards.
- If the clapper has a greasing facility (grease cap or nipple) check to ensure there is grease at the clapper pivot point.
- Motor cycle chain grease spray can ease clapper movement if no greasing facility exists.
- Adjustment for odd-struckness – see Appendix 1.

STAYS AND SLIDERS

- Check that none are cracked, damaged or have insect damage.
- If, when you set the bell, it does not bounce but feels ‘spongy’ then the stay or slider may be damaged and need replacing.
- Check that all stay bolts (and nuts) are in place and tight and the slider moves easily.
- If you have Hastings style stays, these need to be exactly the right length and positioned correctly to ensure correct working. Any slight misalignment can cause the stay to bind and either be difficult to set or be hard to pull off when starting to ring.

WHEELS

- Check that each wheel is tight on the headstock and that all nuts and bolts are in place and secure.
- If any of the outside rim (shrouding) is loose or missing then this needs repairing/replacing.
- Check for signs of decay or insect attack and seek further advice if any is found.

TOWER ROOF AND BELFRY OPENINGS

- Check that no water is coming in through the tower roof or belfry openings and that the netting on the openings is stopping all birds from getting into the belfry.
- If belfry openings are allowing water to enter then some weather protection needs to be fitted.

FIXINGS

- Check that all the nuts and bolts on the headstock, bearing cases, wheel and clock hammers are all in place and tight.

BELL FRAME

Metal Bell Frames:

- Check all nuts and bolts are in place and tight.
- Remove any rust from metalwork, including the metal frame and repaint where necessary.
- If the frame is of unpainted, galvanised steel, check for damage to the galvanising layer. Any chips should be cleaned and painted to avoid a galvanic reaction which can cause serious corrosion.
- Check anchor points of foundation beams in walls for any loose mortar or signs of movement.

Wooden Bell Frames:

- Check all nuts and bolts are in place and tight, particularly tie bolts which pull the top and bottom of the frame together. This is best done after a period of dry weather, when the wood is less likely to be swollen.
- Remove any rust from metalwork, including the metal frame and repaint where necessary.
- Check anchor points of foundation beams in walls for any loose mortar or signs of movement.

CLOCK AND CHIME HAMMERS

- Check any clock hammer and their catch springs are tightly attached and the spring(s) is holding the hammer(s) around 5mm off the bell after striking.
- Ensure Ellacombe, or other chime hammers are secure and striking the bell at the thickest point of the bell's soundbow.
- Ensure all hammers are not fouling the bell fittings when barred off.

DIRT AND RUBBISH

- Clean out the belfry and all intermediate rooms and the ringing room to ensure that all build-up of dirt, rubbish and unwanted clutter is removed because it is a fire hazard and may also hide another problem.

A QUICK SUMMARY OF BELL MAINTENANCE IS:

- If it moves, make sure it can move freely (bearings, pulleys, clappers, sliders, etc.)

- If it is not meant to move, make sure it does not move (frame, clapper crown staples, bell bolts, wheel bolts, etc.).

- If it's rusty clean it and paint it.

Appendix One

Curing Odd-Struckness

Bells with headstocks fitted with 'twiddle pins':

It is vital to wear ear defenders when checking the odd-struckness of a bell.

Firstly, and for each bell that may need adjustment, establish whether the bell is evenly struck by swinging it up until it clappers both sides, and then allow it to swing down unchecked. If the bell is odd struck the clapper impacts will sound alternatively early and late.

As the arc of the bell reduces, the clapper blows on the "early" side will remain loud whereas those on the "late" side will become quieter. Ultimately, the bell will only strike on the "early" side.

Adjustments involve moving the staple away from the "early" side of the bell towards the "late" side in the following manner and with reference to diagram below.

1. Ensure that the twiddle pins rotate freely. Remove, clean, lubricate and reinstate if necessary.

2. With the lock nuts well clear of the headstock, screw both twiddle pins into the headstock until they touch against the staple bolt. Unscrew both twiddle pins by half a turn.

3. Loosen the clapper staple bolt nut slightly and until vertical movement of the bolt is just possible.

4. Unscrew the twiddle pin on the "late" side one whole turn and advance the other pin one whole turn.

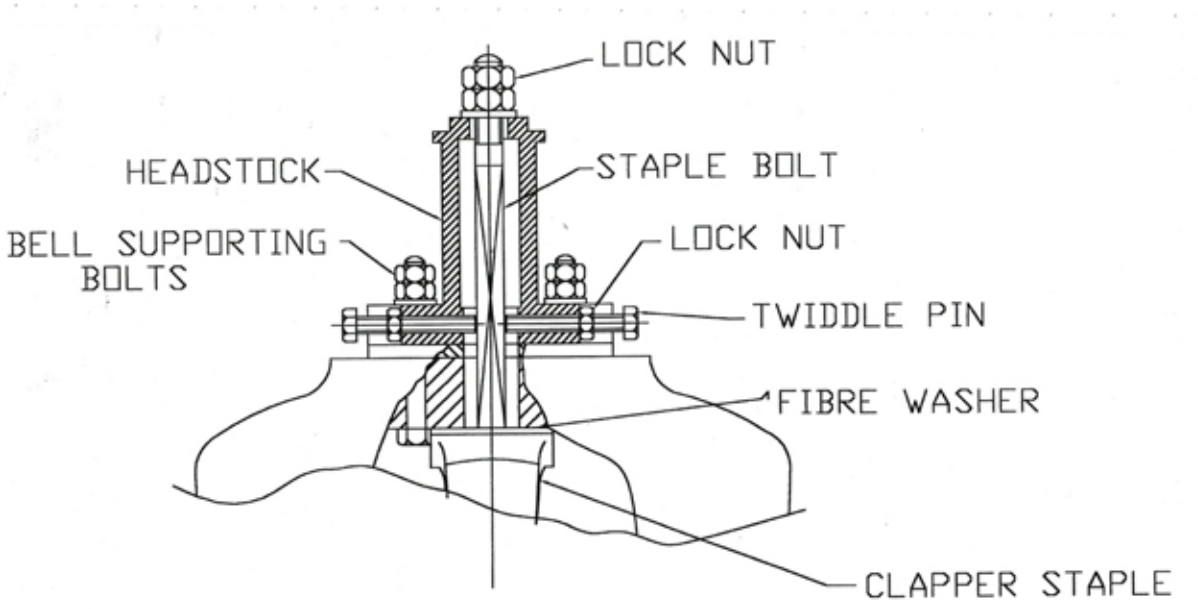
5. Fully tighten the staple bolt nut ensuring that firstly the clapper is swinging true within the bell and secondly that the twiddle pins are only making light contact with the staple bolt. If necessary, unscrew both twiddle pins a fraction of a turn.

6. Swing the bell until it clappers both sides and observe the change.

7. According to the change and as necessary repeat the exercise until the bell is "evenly struck". Note: movements of as little as a quarter of a turn of the twiddle pins can produce a noticeable change.

8. Make a final check on the tightness of the staple bolt nut and lock the twiddle pin lock nuts against the headstocks ensuring that the inner end of the twiddle pin is just clear of the staple bolt.

9. Fit and tension the staple bolt lock nut or fit the staple bolt split pin as appropriate.



Drawing courtesy of Whitechapel Bell Foundry Limited

NB. For clarity, the spring washer between the plain washer and the lower of the 2 nuts at the top end of the staple bolt has been omitted, also the fibre washer and the plain washer between the head of the bell supporting bolt and the inside of the crown of the bell.

Bells with headstocks not fitted with ‘twiddle pins’:

Firstly, and for each bell that may need adjustment, establish whether the bell is evenly struck by swinging it up until it clappers both sides, and then allow it to swing down unchecked. If the bell is odd struck the clapper impacts will sound alternatively early and late.

As the arc of the bell reduces, the clapper blows on the "early" side will remain loud whereas those on the "late" side will become quieter. Ultimately, the bell will only strike on the "early" side.

Adjustments involve moving the staple away from the "early" side of the bell towards the "late" side in the following manner and with reference to diagram above.

The fibre insulation washer between the crown staple and the bell can be replaced with a tapered washer of similar material to move the clapper over in the desired direction. However before this is contemplated it might be worth removing the clapper from the staple and refitting after rotating through 180°. If this does not improve things, loosen the staple and turn the whole assembly through 180°. There are thus four options to try before resorting to tapered washers.

If this fails, substitute the flat fibre washer with a tapered one – the taper is produced by sanding down a flat washer at an angle. Start with a relatively shallow angle and sanding more off if necessary. This process has a degree of trial and error, but is the most efficient method of ensuring even-struckness for bells without ‘twiddle pins’.

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