The Tower Project - Objectives

Quality:

- Improved ringability of the bells
- Improved ringing room environment
- Improved sound of the bells

Stewardship:

- Reduced risk of bells cracking
- New lease of life for the installation
- Should last another century with routine maintenance and only minor work

Problem 1 - Bells are not easy to ring

Odd struckness

- The bell does not strike evenly when swung evenly
- Each bell is different, so it's harder to ring together
- They vary with the weather

Long draught

- Hard to feel what the bells are doing
- Friction from poor rope runs

Mismatch between bells

- Wheel size
- Bell hang

Problem 2 - Ringing room overheats

- Ringing involves expending moderate energy

Summer heat:

- No fresh air
- Sun through large west window
- High humidity inside church

Winter heat:

- Open to the church
- Church has hot air blown in at high level
- Heat rises!
- Ringing room much hotter than at pew level

Problem 3 - Poor bell sound

Tuning:

- Bells not in tune with themselves
- Bells not in tune with each other

Clappers:

- Sound bows worn by clappers
- Clappers worn
- Clappers not ideal material

Problem 4 - Bell audibility

Interest in the project highlighted:

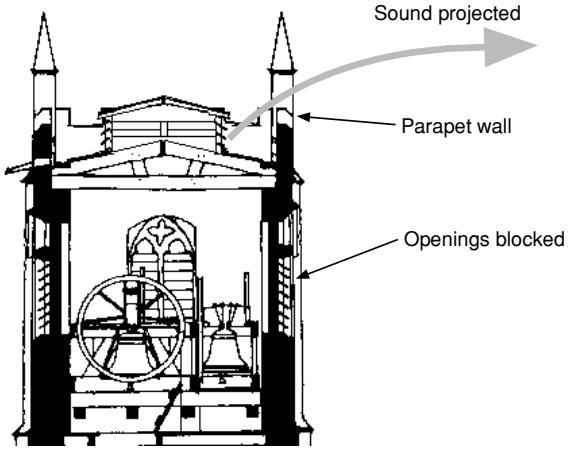
- Bells not audible over all of the Parish
- Lack long range carrying power

To reach all the community, the bells must be audible over a large area

(Solution 4 - Fit sound lantern)

Not yet approved - under investigation

- Large openings on roof let out loud sound
- High position helps sound to travel
- Openings behind parapet create 'sound shadow'
- Area near church only has moderate sound



Solution 1 - Hang with modern fittings

New headstocks:

- Metal instead of wood won't warp with humidity)
- Clapper adjuster bolts (to remove 'odd struckness')

New clappers:

- Old ones worn and not well matched to bells

New stays, sliders & running boards:

- Old ones worn

New ground pulleys:

- Draw ropes under wheels to drop in better position

New or re-built wheels:

- Sizes better graded to bells

Solution 2 - Cooler ringing room

Summer heat:

- Air conditioning unit mounted in ringing room

Winter overheating

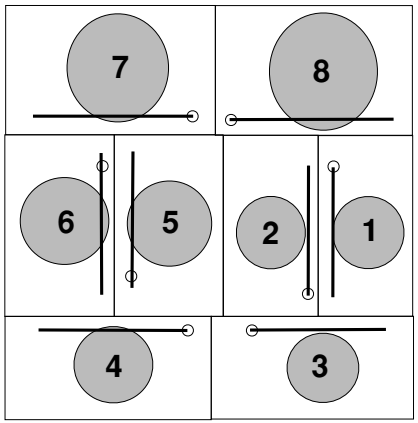
- Install clear sheet glass panel in nave arch
- Keeps hot air out while church heating is running
- Openable vents let warm air circulate during week
- Keep tower dry

Solution 3 - Re-tune and recast bells

Tuning:

- Light tuning of Tenor bell (listed for conservation)
- Recast bells too far out of tune (1, 2, 3, 6)
- Tune all remaining bells
- Resulting harmonious ring of bells

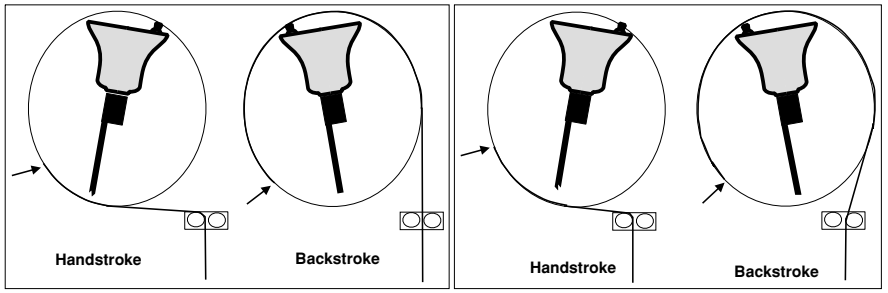
Bell & rope position



The bell positions are constrained by the space in the tower.

Where the ropes fall is determined by which side of the bells the wheels are fitted, and which side of the wheels the rope is attached.
This gives a poor 'rope circle', so the ropes must be drawn sideways on their way down to the ringing room.

Position of ground pulleys



Current position Set in.

Moving the pulleys under the wheel allows the ropes to drop in a better circle, removing the need for them to be 'drawn' sideways on the way down to the ringing chamber. A straight drop reduces both friction and handling problems.

Clapper wear

Repeated impact of the clapper on the bell wears a pit in the bell and a flat on the clapper. When the pits become deep they weaken the bell. Some are approaching the recommended 10% safe limit.

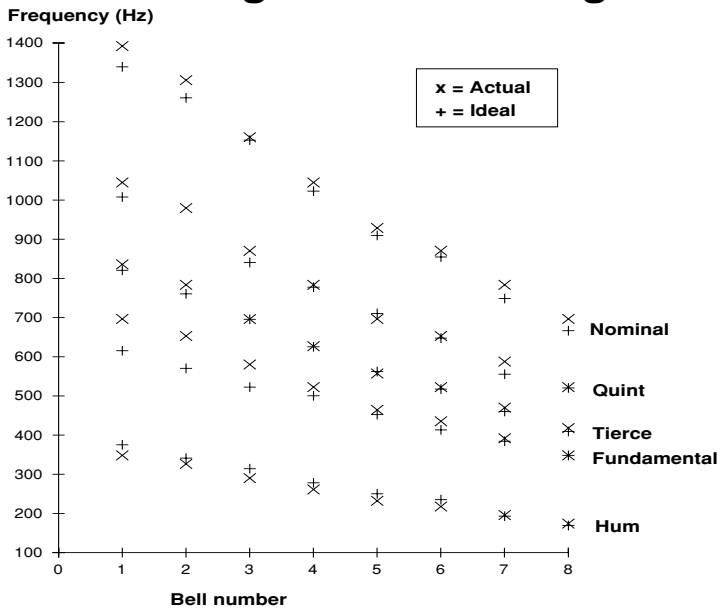
'Turning' the bells (mounting them at a different angle on the headstock) allows the clapper to strike a fresh area of the soundbow. Some of the older bells have been turned 90° already, and the Tenor has also been turned 45° once.

Tuning - the ideal bell

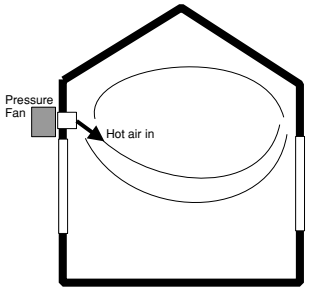
The bell sound includes many different frequencies. The shape and thickness determines what they are. Different 'partial' frequencies are tuned by carefully shaving metal from different parts of the bell. The ideal ratios of the most important partial frequencies are:

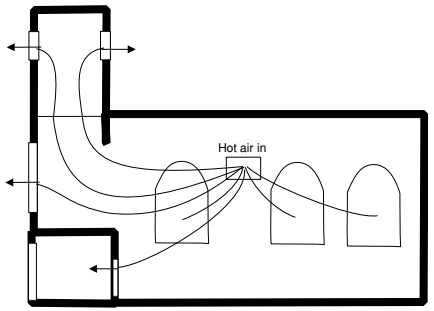
Hum	0.5	Octave below
Fundamental	1	
Tierce	1.2	Minor third
Quint	1.5	Fifth
Nominal	2	Octave above

Tuning - what's wrong



Heating - the problem



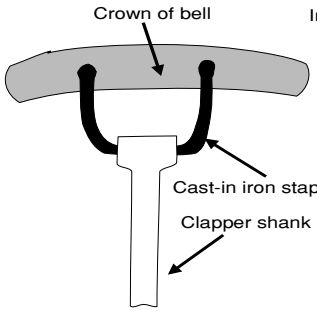


Hot air is blown in and circulates at high level. slowly spreading down to warm the people.

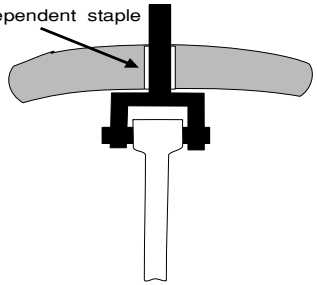
It spreads round the building by seeking leakage points, including the tower, which gets very hot.

The commonest cause of cracked bells

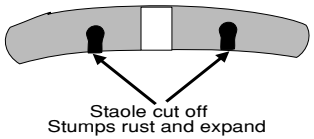
Clapper fitting - Old style



Modern style



Conversion - Old practice



Modern practice