Good striking

What is good striking? How can we achieve it? Those deceptively simple questions have far from simple answers, as shown by our recent experience in the Guild striking competition. We were placed 6th out of 10. Just above us (with 80% and 81%, compared with our 78%) were two of the leading bands in the Guild. But the judges made very different comments about the three pieces of ringing:

4th ... Very good. A good rhythm from the Tenor, but with some stretch around it. Nice. No major trips. ...

5th ... Open leads a bit erratic. Overall pretty confident. Would have sounded nice in the churchyard ...

6th ... Lots of minor faults. It felt unsettled, edgy and nervous. Lacked confidence ...

How could the scores be so close, with the comments so different?

What is good striking?

Perfect striking is completely even ringing, with the intervals between each successive blow all equal (counting the open handstroke pause as a blow). So good striking is ringing that gets close, and doesn't deviate too much from the ideal. But there are many ways to deviate. A test piece of Minor typically contains 1700 – 1800 blows, which can all vary, but the result has to be summed up in a few sentences and a single score. To understand that, you need to understand what the judges are trying to do, and how they (or any humans) react to imperfect striking.

Faults

Striking results are normally based on 'faults'. They might be given as faults (or faults per hundred rows, if the test piece length can vary) in which case the team with lowest score wins. Alternatively they can be given as a percentage, calculated by subtracting the actual number of faults from the maximum possible (usually expressed as a percentage) in which case the team with the highest score wins.

A 'fault' is a deviation from the ideal. But how far must it deviate to count as a fault? And does a bigger deviation count more than a small one?

In Figure 1, the first row of dots is evenly spaced, ie no errors. The second row has one dot moved 10% of the spacing, the third row has a dot moved 20% of the spacing and the fourth row has a dot moved 80% of the spacing. So each row has a single 'fault', but they are not equal faults. If the dots represented striking, most people wouldn't notice the 10% error, and everyone would hear the 80% error as a 'clip'. People would differ in how or whether or not they spotted the 20% error.

Figure 2 contains eight separate errors of 10% each, the same total discrepancy from the ideal as in the last row in Figure 1, but spread out in small bits, each of which is hardly noticeable on its own. Many people listening to the first part would fail to pick out where the errors were, if they noticed them at all, but they would be far more likely to spot something wrong in the second half, where three adjacent errors are in alternating directions.

So what is a 'fault'?

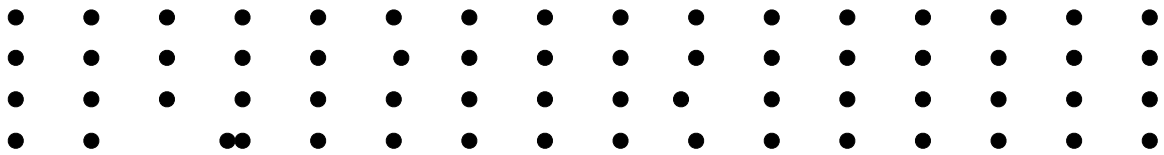

Figure 1

Figure 2

Measuring striking

It is possible to measure striking with a machine. Mike Pickup's Strikeometer was used at the 1993 Branch 6-bell competition and placed the teams in the same order as the judges. Not long afterwards, it was used at the National 12-bell competition in London.

The machine is capable of measuring every individual deviation and adding them all up, but that is too difficult for a human, so judges do something cruder. Different judges use different schemes, but common features are:

1 Try to set a mental threshold for the size of disturbance, and try to ignore anything less.

2 Try to set two thresholds, giving a higher penalty for the higher one.

3 Assess each row as a whole, rather than trying to analyse individual blows.

4 Adjust the raw scores to give palatable numbers at the end.

Setting thresholds is very hard for humans, especially trying to maintain consistency over many teams of different standards, but if you don't do it, then you saturate yourself trying to record every tiny blemish. The human brain is much less well suited to scoring based on trying to measure or count errors than a machine is, and it is not unknown for judges trying to count faults to produce a result that doesn't fit the perception of ringers listening outside.

Perceiving striking

Humans may not be so good at the mechanistic process of measuring and counting faults, but they can interpret what they hear, and assess it in subjective ways. That might seem a poor second to measuring it, but in some ways it is better. The ultimate purpose of ringing is for people to listen to it, so the ultimate yardstick of quality is how good it sounds to the human ear, which might not be the same as what a machine can measure.

When a human brain listens to ringing, it responds at several levels. It will perceive attributes like speed (without reference to a clock) in terms like 'rushing' or 'dragging'. It will hear large irregularities as discrete features, but it will perceive smaller irregularities in terms of 'unevenness', 'hesitancy' or 'falling over itself'. It will also interpret the sound, as it does other sounds, and infer attributes like 'confidence' or 'uncertainty'.

These qualitative terms often feature in judges' comments. They might not have the precision of a numerical score, but they relate more closely to the experience of a human listener, and they usually relate to the experience of the performers as well. Ringing that sounds 'nervous' is often produced by nervous ringers. Ringing that sounds 'unsettled' is often produced by a team whose members have not been able to blend their ringing properly together.

Achieving good striking

Given that it is possible for a human to detect errors of a few hundredths of a second in otherwise even ringing, and given the nature of the bells and how they are controlled, one could conclude that good (ie near perfect) striking is impossible for mere mortals. We know it is not impossible, because some bands can do it, but it is certainly very hard, and many bands never achieve it. So how is the required precision achieved?

Let's start by being clear about how it can't be achieved. If each bell waits until it can see the bell in front 'pull off' and then 'pulls off' after it, the result might not be bad striking, but it certainly won't be good striking, for several reasons.

- It is impossible to move something as heavy as a bell (even a 'light' bell) instantaneously. You have to work with its natural rhythm, adjusting it a bit faster or slower as required.
- It is impossible to execute a last minute decision. With six bells, the one you are following is typically only 300ms in front, about the same as the best human reaction time (and much less on higher numbers).
- The relationship between rope movement and bell sound differs between bells, especially if any are odd-struck.
- If one bell is not quite in the right place, its error will propagate by disturbing following bells.

Good ringers rely heavily on rhythm, which means thinking ahead and not being dependent on seeing the bell in front in order to place the blow. By the time the bell in front is 'in place' so are they. They trust their sense of rhythm to be able to ring the next blow in the correct place, based on the rhythm established by previous blows. They continually listen to check the accuracy of their striking, and to make any necessary small rhythmic adjustments. They adapt to the overall rhythm, rather than to a single blow of the bell in front of them.

Leading has a critical effect on the overall striking, partly because it is the point at which everyone's handstroke and backstroke rhythms 'meet' and partly because disruption of the start of a row has a disproportionate effect on one's perception of the rhythm. Leading represents a vulnerability because it is where there is continual switching between hunting down and hunting up rhythms. For ringers unduly influenced by seeing the preceding rope it adds the additional problem that the bell in front is the last bell of the previous row, which is on a different stroke.

Nominally the open handstroke gap is exactly one blow, see Figure 3, but in practice good striking can use a slightly different interval providing it is constant, and providing that all the other intervals are equal.

To achieve this, all bells need to ring with the same hand-back rhythm, not just the lead bell, as sometimes supposed. Figure 4 illustrates this. The grey strips each represent 6½ blows. The half-blow gaps at alternate ends of each row combine to give a whole-blow gap between back and hand, with no gap between hand and back. The orange line shows the alternating quicker and slower blows corresponding to the intervals between successive blows in 3rd place.

In a good team, each member helps to establish a stable rhythm, with which they are all comfortable. This in turn allows each individual to perform more effectively.

Figure 3

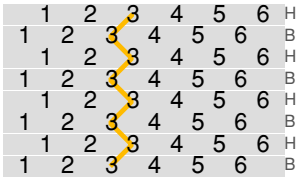

Figure 4

Scores, comments and perceptions

How does all this relate to the ringing at the striking competition? I listened to over half of the teams, and these are my reactions.

Some of the ringing was extremely good, really even and flowing confidently, with only occasional minor disturbances. The brain's response to such ringing tends to be to latch onto the even rhythm, go with the flow, and ride over the occasionally deviations. That doesn't mean there are no deviations of course, and the judges specifically commented (of the team placed 3rd) that: 'Those listening in the churchyard probably thought it one of the best, but there were small errors'. I would apply this comment to the two teams placed just above us as well.

Some of the ringing was much less even. The deviations were not huge, but with regular slight hesitations or a slight clips, my brain found it harder to latch onto the underlying rhythm, and I suspect that the underlying rhythm wasn't quite even anyway. The judges commented on 'stretch' of the rows in some pieces.

It's always hard to compare your own ringing with that of other teams, because when you are inside focusing on correcting any minor deviations, you tend to be far more aware of the blemishes. Even allowing for that, my qualitative perception of our ringing was that the rhythm was not entirely even, and there were many, admittedly quite small, deviations.

From the results, we know that the judges' subjective perception of our ringing was quite different from their reaction to the teams placed just above us. That is consistent with my perception (even allowing for the fact that I heard ours from the inside).

From the closeness of the scores, we also know that number of our deviations that exceeded the judges threshold was not a lot more than the number that exceeded their threshold for the other two teams.

In their marking, the judges were of course trying to be objective, whether marking pieces with a good rhythm or pieces with a less regular rhythm. They would not allow a good rhythm to lull them into ignoring the occasional deviations, nor would they mark every minor blemish in an irregular rhythm. From my experience of judging, it is much easier to mark regular ringing, because the deviations stand out more clearly. It is much harder to mark less regular ringing, because you a continually having to differentiate between minor unevenness (that you intend to ignore) and more significant deviations (that you intend to record). The judges commented that one piece (placed quite low) was quite hard to mark. It is difficult comparing the scores of the two types of ringing.

I think that the apparent inconsistency between the judges marks and their subjective comments is explained by the different styles of ringing. Had a machine been doing the marking, I suspect there would have been more difference between our score and those of the teams ahead of us.

How to improve?

To perform well in competitions that have a high standard, like Guild competitions, and thereby benefit our service ringing as well, all of the team must be capable of ringing mainly by rhythm, and confident in their ability to do so. We also need adequate practice, so that we can blend together as a team.

The best way to achieve the first objective would be to raise the general standard of our ringing in the tower. That would be worth doing anyway (and it is the main motivation behind striking competitions). With a more capable pool of ringers we could field a more capable team, but there would be another important benefit. The team would be used to ringing to a high standard. Currently, those selected for the team have to push themselves to try to ring well above the standard that we normally experience in the tower, which is a lot to ask. And the extra stress does not help to produce rhythmic ringing. Instead, it encourages the sort of 'tight' ringing that we had, which can help to reduce the error count to a degree, but is also 'tense', which undermines the rhythm, and will prevent us achieving really high performance.

Ringers vary in the extent to which they rely on rhythm. Some rely almost entirely on it, and some rely almost entirely on seeing ropes to follow. Many fall somewhere in between. At the conscious level, they are looking for and following ropes, but at the subconscious level their natural sense of rhythm, coupled with the bell's rhythm, help to smooth out the result. They can strike quite well when surrounded by rhythmic ringing, but if the striking around them deteriorates, they over-react to it, and increase rather than reduce, the overall unevenness. 'Trying harder' does not always help, and may even degrade rather than improve their striking, because it shifts the emphasis towards the conscious (rope following) task rather than the unconscious (rhythmic) moderator of the task.

There are many things that we could do to help us all to become more rhythmic ringers. I won't expand on them here, but some are being discussed among the officers already, so watch this space.