Pullometer progress

It's three years since I issued the original pullometer challenge, and the Editor invited me to provide an update. But first a brief recap.

The idea of a pullometer has been around for decades as a potential tool to help teaching ringers. Bell control requires the ringer to know (or in practice feel) exactly how much force to apply and when to apply it, so the bell behaves as intended. Some ringers learn this skill instinctively but many struggle. Typically they use to much force, too late or to soon, and end up fighting the bell rather than working with it.

The challenge was in two parts, first to demonstrate feasibility and then to achieve 'marketability' (a design suitable for widespread acquisition and use). The first part was achieved after a year, but the second part is harder. There has been progress but not from all participants. Real life and the day job can get in the way of even an exciting project like this.

News of the challenge must have spread across the Web because out of the blue I received a message from someone in Bucharest who was keen to take part. He had no knowledge of ringing other than what he had worked out by looking on the web and watching videos of ringers. He hadn't quite grasped the essence of how the ringer controls the bell or how the pullometer would be used.

When I set up the challenge, and offered cash awards to whoever succeeded, I was inspired by initiatives like the Kremer prizes for man powered flight, which gave the topic a higher profile than it otherwise would have. and which has so far led to three of the challenges being met.

But doing it like that inevitably made it a competition between participants, so I needed to treat them all fairly. So when they told me about what they had done or their plans I didn't tell them what the others were doing. (I did provide a summary in *The Ringing World* article, but they all approved that before publication.) And if I gave one of them advice then I gave the same advice to others (assuming it was relevant to the approach they were taking). That way I felt I could encourage progress and be even handed.

But competition isn't necessarily the best way to proceed. As things progressed it became clear that participants had differing areas of interest and expertise. Richard Johnston prompted me to consider encouraging collaboration, perhaps with people working on different aspects, so in the summer I contacted everyone to seek their views.

I summarised how far we had got and I discussed some issues on various aspects of the task: reliable measurement, separating the ringer's force from other forces, variable strokes, the difference between force and effect, the significance of place and place changing, seeing the big picture v seeing detail, alternative ways to visualise information, the merits of dynamic and static displays, comparing results, numbering strokes and possible integration with other training tools. The length of that list gives an indication that there is lot more to developing a useful pullometer than might at first be apparent.

I then summarised how far we still had to go in developing the equipment and its user interface, and gaining practical experience of how to apply it, and also in the process of understanding much better what really happens between ringer, rope and bell during ringing.

All participants were happy with the idea of collaboration (though some thought they might not be good collaborators). Competition was not a strong motivator, and one person offered the view that the cash prize wasn't much more than a rounding error when compared to the time and money being invested. Unfortunately I can't compete with the size of the Kremer prizes (£170,000 awarded so far and £150,000 still available) so the pullometer challenge relies mainly on the participants desire to solve the problem, with the cash award as a welcome extra.

Putting participants in touch with each other led to some of them studying each other's software on the GitHub repository, which I know created some interesting thoughts.

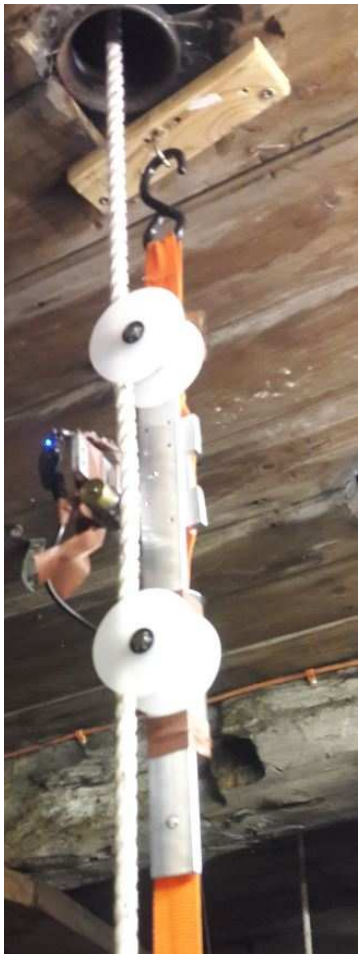
More significantly it led to Richard Major and Peter Budd meeting to compare results by running their current devices (see pictures) running side by side on the same bell. That could be particularly enlightening because they are using different approaches to measure the rope force (direct measurement v deriving it from inertial measurements).

As well as progress on the practical front there is related discussion about how a pullometer ought to work, and by implication what problems it would help to solve.

For example, if a pullometer were available now the most widespread use would almost certainly be to help solve the problem of learners (and others) overpulling – either out of habit or because they think the bell will drop if they don't – by showing then how much force they are actually applying, and equally crucially when they are applying it. Reliably detecting large forces is easier than accurately measuring small forces so a (relatively) crude device could meet this need.

But avoiding excess isn't the only goal for ringers. Making an analogy with driving, we don't just want pupils to avoid hitting the kerb, we also want to teach them to drive accurately down the middle of their lane. Good bell control requires sensitive use quite small forces, so if the pullometer is to be a useful aid when coaching ringers at this level it needs to be accurate, and to be able to handle quite low levels of force. That's harder to achieve because any any measurement is prone to 'noise' (the inherent element of randomness) which has to be kept lower than the levels being measured.

Although there are still problems to solve, I'm confident that we are getting closer to having a pullometer available for more widespread 'real use' in training, which in turn will no doubt generate more insights not just into how it can be used, but also into our understanding of the complex art of bell control.



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