

Large projects as a catalyst for meaningful innovation

Implementing paperless recording at scale

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Using examples from recent large infrastructure schemes in the UK, this paper will discuss the benefits and challenges of scale when implementing new ideas in archaeological recording and data management. It will highlight the qualities required in the project team, the character of successful technological solutions and some of the unexpected side effects of evolving the way we do archaeology. Studying the processes of data management presents an authentic microcosm of the complex world of large projects, and lessons learned from this discipline can be applied much more broadly.

Large projects are attractive targets for trying out new ideas. Principle contractors are expected to demonstrate a culture of innovation as part of their bids and will seek to differentiate themselves from their competition by encouraging innovative ideas from their supply chains. This may lead to novel partnership, funding and promotional opportunities for subcontractors that would not normally be available. The scale of these projects also drives invention by necessity – there are serious challenges to overcome when gathering and processing such large quantities of information, and often limited time available in which to resolve them. For the data team, this can be daunting, but also very inspiring and rewarding.

There are other challenges to innovating at scale. Unsuccessful application of new ideas can bring quality, reputation and financial risks for an organisation and the project. Lead times are often short, specifications changeable, relationships between stakeholders are complex, and small issues can be easily multiplied or miscommunicated. With larger project and field teams, it can be challenging to keep everyone on the same page.

The examples in this paper are derived from extensive experience on major road and rail projects in the UK. The challenges and successes of managing data on the A14 road project are discussed in detail elsewhere in this session. The value of going through the process of integrating systems between the two organisations involved cannot be underestimated. This was an important mechanism for building common understanding, developing the best working practices possible, and providing a lasting legacy for both companies. This latter point is a theme to which this paper returns.

Over the past few years, Headland Archaeology and MOLA have been working together on another major archaeological programme, focused on two major urban cemetery excavations. The excavations expected to record and recover 12,500 post-medieval burials in parallel archaeological programmes lasting around 9 months, with a total of 160 archaeologists on the ground. The scale and speed of data gathering would be high; the sensitive nature of the remains required a very high level of data integrity; and a range of specialists, managers and other stakeholders would require access to detailed information throughout the programme, often with very short turnarounds. To deal with these challenges, the data team had to re-think their existing approach to recording and data management on an archaeological site. The recording and data systems used on A14 had performed admirably, but further improvements were going to be required.

Paperless recording on site has been a long-standing ambition of archaeologists. Born-digital data has been proven repeatedly as more efficient, reliable and useful in areas such as surveying and photography, but a purely digital written record has been more challenging to implement robustly. Issues of connectivity, scale and supportability in particular have been difficult to overcome. Headland Archaeology had been developing its approach to paperless recording for some years and had made some careful decisions about the character of a viable system. This work led to a close collaboration with a development partner who had a system that aligned very well with these core principles. The large cemetery excavations were an ideal opportunity to test this on a major project. Cemeteries, while logistically and often stratigraphically complex, are relatively simple in terms of recording. The variety of archaeological types is limited, which reduces the

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risk of introducing new methods as the development could be focussed on doing a small number of things very well.

This paper will expand on the process of proving, developing and deploying paperless recording to the cemetery projects. This required confidence, vision and tact in equal measure. The team incorporated techniques common in software development such as agile development and DevOps, and new ways of collaborative working with Trello, Slack and other tools.

The excavations achieved their overall archaeological and contractual goals and served as an excellent testbed for this new methodology. The system scaled very well and proved extremely reliable. The cemetery excavations are believed to be amongst the largest ever paperless archaeological programmes ever undertaken, with over 37,000 context records and 80,000 photos and sketches gathered by the team. Within weeks of the completion of fieldwork, the data team had fully audited the key data and prepared all required outputs for reporting and further work. The audit revealed zero missing records, zero duplicates and with a little work, 98% of key fields complete and valid. This was a remarkable achievement for the team and the paperless system, both of which are now fully battle-tested and ready for another challenge.

Large projects can have a wildly disproportionate pull on the resources of a company, including staff, equipment and attention. This is exacerbated by promoting new ideas exclusively on such projects and can lead to a feeling amongst core staff of being left behind or ignored. This is a valid concern which must be addressed with skill by company management. The data team can have a positive impact in this regard by thinking about the legacy left by large projects, and building in plans for incorporating the best practices and methods into the normal work of the organisation. This can be a very different challenge, where established practices are tested, and systems built for large scale single projects must be adapted to much smaller, distributed work. This requires a receptive culture within the organisation and ideas that can scale down as well as up.

There is a tendency in commercial archaeology to perceive every individual project or situation is completely unique and in need of bespoke thinking and solutions. There are also barriers within and between organisations to communicating good ideas, or in realising that a good idea has wider applications. Generic skills such as managing change, successfully implementing new ideas and communicating well are often underplayed in favour of purely archaeological or commercial expertise. It is for this reason that conferences such as CHNT are so important – as an industry we constantly need to demonstrate our value to clients and the greater population. It is hoped that papers such as this will give others a head-start in dealing with some of these complex issues - after all, a rising tide should lift all boats.

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Fig 1 – A quiet day on one large excavation (© MOLA Headland Infrastructure)



Fig 2 – The data team must adapt their skills to deal with new issues, such as how to reliably backup and charge 80 tablets every night on a construction site (© MOLA Headland Infrastructure)