

As the responsible Project Manager, how would you approach the process of introducing a specified new piece of equipment (such as a survey unit or microscope) or change in working practice (such as revised recording form) for use by your team, and what measures you would take to ensure that it was being used correctly and safely (documentation, training and monitoring)? (40%, 3000 words or equivalent)

Introduction

Change is inevitable, and archaeology is no exception. There are many resources available to the Project Manager when implementing change in the workplace, with many of these becoming more commonly used within archaeology (Historic England 2015b). Resources existing outside of the discipline can also be of use, particularly management frameworks that use product-based planning. This Project management framework is not just for the planning of individual sites and Projects but can also be used as a means to structure decision-making, such as introducing a new piece of equipment to a team. Related frameworks also assist in ensuring safe and accurate practice, though many are not entirely extricable from financial planning. Having a robust Project structure ensures that financial aspects are not only accounted for but their effect on involved parties understood holistically. Project Managers who do not use such a structure often assume that it is an overcomplication and that such a robust structure is restrictive, yet it is undoubtable that the use of product-based planning minimises the likelihood of a range of errors. Such a system will be used here to explain how a new piece of equipment will be introduced to a team of geoarchaeologists.

Introducing new equipment

The piece of equipment that will be introduced to the team is that of a power auger, a motorised tool that uses percussive action to drill into the ground and obtain geoarchaeological column samples. In order to select the most appropriate type and brand of power auger while ensuring

that staff are trained on its safe use, its acquisition and subsequent introduction must be carefully planned. To use product-based planning for its introduction, the Project Manager will approach the task as a mini-Project, breaking down the decision-making process into structured Stages. This will guide the process from beginning to end. Alongside this framework, research into change control processes will be used in the Start-Up Stage to best understand the overall Scope of the Project. From this early Stage (and onwards), it is important to describe and explain the need for the piece of equipment and the impact that its acquisition and integration will have on the company. In doing so, both the advantages and disadvantages of acquiring and introducing the equipment will be examined. These will relate to financial Project matters, yet also to implications on staff safety and knowledge. By implementing static review Stages, the Project will plan for a system of ongoing review and alterations where necessary.

Project Start-Up

To begin the process of introducing the power auger to the team, a Project Proposal must be created. The aim of this Stage is to present the reasons for acquiring and introducing the equipment. Such reasons will broadly relate to staff benefit, research benefit, and financial benefit. Understanding these reasons serves to identify the requirements for staff training at later points in the project, particularly as these relate to safety and staff knowledge. If reasons for the equipment acquisition appear to be capable of thematic categorisation from this Stage, a set of Objectives will be created within the Project Design document.

The creation of a Business Case during this Stage will allow the Project Manager to present the financial reasons behind the Project, yet an accurate Project Scope cannot be discerned by analysing financial matters alone. The true Project Scope will be demonstrated by understanding the context of the idea according to change management processes (Jick 1991), examining the different problems that have arisen due to the company not currently possessing

a power auger and how these may manifest. Melding these two techniques builds a realistic picture for the Senior Management Team, weighing research and staff benefits against financial costs. The Project will be heavily influenced by change management processes that champion open and collaborative communication (Ford and Ford 1995) while attempting to understand the different pressures that individual team members may feel in helping to deliver the Project (Mento *et al.* 2002, 51).

In this brief definition of the Project Scope, it will be important to explore possible Project pitfalls and equipment disadvantages. Doing so builds the contextualised financial image aforementioned yet also protects staff. Understanding the limitations of a piece of equipment ensures that it is not deployed incorrectly. For example, while power augers are used to take deeper core samples than that of a hand auger, it is not suitable for use on soft ground or for shallower depths (Canti and Meddens 1998, 97; Historic England 2015a, 27-28). Staff would be exposed to unnecessary levels of noise and vibration in doing so, risking hand-arm vibration syndrome and damage to hearing, respectively. Using the power auger improperly may also result in the core sample being difficult to retrieve or becoming contaminated. Such retrieval would also be physically difficult and may cause staff moderate to serious strain, particularly if the assistive lifting rig is not useable. However, the correct deployment of a power auger would improve overall staff manual handling; disadvantages and advantages are closely related in this Project. This Scope and its related Business Case will be under frequent review during this Project, also being expanded upon in later Stages.

Review Point One

The first Review Point is an agreement in principle; no resources have been allocated to the Project yet. The Senior Management Team will compare the Project Scope with its financial viability. As this team will allocate resources for the Project, it is important the Project Proposal

is accurate. This will be determined by examining the Project Scope as it manifests within the loosely categorised benefits, and the extent to which these may be separated into specific Project Objectives within the Project Design. At this Stage, the Senior Management Team may make suggestions in widening the suggested Project Scope or provide more insight into financial matters. If such additions are substantial, the Start-Up Stage should be repeated. Otherwise, the Project can proceed towards Initiation.

Project Initiation

At this Stage, a Project Design document will be created, expanding upon the points made in the Project Proposal document. The Project will be designed along two pathways: financial and research (including staff benefit). For the former, Appendix One has been created to address potential staff costs for the Stages of the Project. Throughout the Project, financial implications will be continuously reassessed by examination of the Project Business Case. For the latter, the reasons for the equipment acquisition and introduction as specified in the brief Scope of the Project Start-Up have been expanded into a series of Objectives (see Appendix Two). Each objective will be expanded upon in the Project Design, allowing the Project Manager to describe the implications of each Objective most effectively upon equipment acquisition and introduction. This will be the most important Stage in identifying gaps in staff knowledge, ensuring that equipment (when acquired) is used accurately and safely. The Objectives have been created to explicitly link financial implications (Objective Three) to research (Objective Four) and staff benefit (Objective Two) and development (Objective One).

The Project Design will also detail a Risk Management Strategy, in which potential Risks (positive and negative) are identified and predicted. These Risks relate to the likelihood of Project delay. These will be analysed for the acquirement of the power auger itself but also the Risks that may be result from the use of the equipment on site. Objectives One and Two have

also been created to account for such Risks in both contexts. A nominated senior member of the Geoarchaeological Team will monitor this Risk Management Strategy when working with the equipment on-site, ensuring that the plan is dynamic and that delays are minimal. The Project Manager will also oversee the creation of an Equipment Representative, a member of the Team that will help to maintain and cultivate knowledge surrounding the power auger within the team. Time will be allocated biweekly for this individual to revise their knowledge, yet other members of the team will be regularly allocated time to do so. This may involve undertaking relevant internal training implemented by the Safety, Health, Environment and Quality (SHEQ) team. Such training will also help to minimise Project delays caused by the likes of staff injury or environmental concerns and will inform best working practice with the tool.

Review Point Two

This Review Point will conclude the Initiation Stage and will invite examination of the Project Design by the Senior Management Team and the Geoarchaeological Team. This will provide an opportunity to communicate the needs of the Geoarchaeological Team while providing information that will assist in setting a realistic budget for the power auger. As an agreement in principle has been given to resources that will allow the acquiring of the equipment, failure of this Stage will result in a redrafting of the Project Proposal. Although their involvement precedes this Stage, it will be important to fully debrief all team members on the expectations of training and equipment use. This will also provide an opportunity to fully discuss and examine any individual staff concerns on using the equipment in a way that will inform individual Risk Assessment Management Strategies (RAMS) upon Project Completion. As the power auger is a heavy (individual pieces of the equipment weigh up to twenty-five kilograms) and powerful piece of equipment, individual concerns may vary. While some may have no issue, others may object to the weight or sound of the equipment. Withstanding issues relating to manual handling will already have been assessed (such as staff health conditions or considerations), yet other

individual requirements must be considered. For example, some members of staff may find the noise of the equipment produced intolerable for sensory reasons. If they cannot be reassured with adequate ear protection and training, allowances must be made. When all considerations have been made and the Project Design approved, the Project may proceed towards Execution.

Project Execution

The Stage of Project Execution will be a Stage in which onward Review is defined. This Stage will see the comparison of the results of the research detailed in the Project Design document against the Project Objectives in order to understand how the Project will approach Closure. As review at this Stage is continuous (see Figure One), new results will be incorporated (such as input from training and experience). Standard methods and practices going forwards will be defined in this Stage to ensure that the equipment is used safely and correctly. This will be dictated by the type and brand of power auger selected, as the instructions of the manufacturer will help to inform how often the equipment must be serviced and maintained. Depending on equipment type, equipment calibration and supervised trial runs may be required. A record of these will be kept and stored securely in keeping with Provision and Use of Work Equipment Regulations (1998). This will reassure and protect future users of the equipment, allowing them to concentrate on its accurate use. Continuous onward review will identify any gaps in staff knowledge or training by the Equipment Representative and Project Manager.

Project Objectives (see Appendix Two) may be revised or expanded upon at this Stage if required as per the process depicted in Figure One. This type of review will be used to perform research into the type and brand of power auger that will be the most appropriate and the training that will be required to integrate it into use by staff. The results of prior research will be expanded upon and compared to the results of using the hand auger in order to predict profit scale and initial implementation. The requirement for training will also be factored into this analysis. The

power auger offered by Van Walt (Van Walt 2025) fills many such requirements, uniquely providing in-person training on the equipment alongside training in creating appropriate yet dynamic RAMS for on-site use. Resources were allocated for such training in Appendix One. It will be important to understand the risks to health and safety through this session to understand the safe use of the equipment most appropriately.

This in-person training will also provide a valuable opportunity to ensure that all members of staff understand how to safely use the power auger, regardless of individual differences. These individual differences will be manageable, such as differences in height and different lifting abilities. Being present at the training, the Project Manager will note such implications and bring these to the next Review Point for group or individual mitigation. Prior to this training, a refresher on manual handling will be given by the company. Meeting in person will also provide an opportunity to ensure that all members of the team have appropriate personal protective equipment (PPE), including appropriate footwear, ear protection, and eye protection. As per change management strategies, it is vital to communicate potential changes in working practices correctly to all team members to ensure that they do not begin to resist the change (Mento *et al.* 2002, 55). If this were to take place, there may be negative implications on staff safety and accurate use of the equipment through reduced motivation.

Review Point Three

This final Review Point will revise (if necessary) and finalise points made in the Project Design document. If this review is required due to a change in resource allocation, an Updated Project Design document will be created. For example, Stages detailed in Appendix One may be revised due to staffing reasons or feedback from the Execution Stage, allowing lessons learned to be detailed by the Project Manager. Potential revision of Appendix Two will require more extensive alterations, potentially selecting a different type or brand of power auger. As a result of this,

Objectives may be combined, revised, or removed entirely. Objective One will be examined particularly in this Review Point, as some members of staff may feel that they require further training.

The Project Manager will also use this Review Point as an opportunity to gauge the level of understanding of the equipment by all team members, encouraging open and honest communication on enthusiasm regarding training sessions and requirements. This will be acquired through an in-person meeting where possible. If necessary for site safety and knowledge, alterations to the Design must be undertaken. If these are very extensive, the Project in its entirety may be reevaluated. This meeting will also allow the Project Manager to ensure that an appropriate staff member has been nominated as the Equipment Representative. The Project Manager will hold an individual feedback session with this team member to ensure that they feel content and competent in undertaking this role alongside their general role. There will be open communication between the Project Manager and the Equipment Representative to ensure that training time is appropriately allocated.

This feedback may also result in revisions to the overall Business Case. The Project Manager will here consult with the general Senior Management team of the company to present the specificities of this case. It is difficult to predict the extent of revisions to the Business Case at this Stage during this exercise as it must be reviewed against the dynamic Project Objectives. Further costings may be required for more staff training or a more or less expensive type of power auger. The cost of further equipment to complement its use will also be considered. If all staff members agree that a suitable power auger has been selected, the equipment may be purchased and rolled out for on-site use.

Project Closure

Through the commencement of the Project Closure Stage, all members of the Project team agree that all agreed work specified by the Project Design has been undertaken. This Stage will involve the purchasing of the power auger by the Project Manager, with the equipment being rolled out for use on site. The storage of the equipment and its related paraphernalia will also be accounted for at this Stage. As it is petrol-powered, it is important that safe storage of fuels is ensured, yet these should be accessible enough to not pose a significant risk to works (this will be detailed in the Risk Management Strategy). This will be a collaborative effort, with controls designed by the Project Manager yet supervised by the Equipment Representative. The Closure Stage will create an End of Project Report, in which changes from Project Start-Up will be detailed and discussed. This will be an important exercise in detailing lessons learned from this Project for use on future projects of a similar nature. This Stage will also allow for an overall evaluation of the Project through the means of a Post-Project Evaluation Plan.

The creation of a Post-Project Evaluation Plan alongside the End of Project Report will assist in ensuring that the ongoing integration and use of the equipment is consistently reviewed. This report will be created after the initial period of equipment introduction has passed, as to be defined with the Equipment Representative. It is also hoped that the passing of this period will have allowed for the use of the power auger on a number of different sites. It is the aim of the Project Manager to understand how the power auger factors into regular use on a variety of sites and in different conditions (such as varying weather), allowing for the introduction of new equipment to be easily replicated in the future. In doing so, a number of disadvantages of equipment use may be negated or ameliorated through pre-emptive measures. Some difficulties may only become apparent when working on particular sites, perhaps when ground conditions do not facilitate its use. It is important that a realistic Scope of the power auger is continuously reviewed within this document and beyond. Furthermore, it is important that the power auger is only used when necessary. Prior to this, the importance of a traditional hand

auger has been identified, and staff members will be trained in discerning the most appropriate type of auger to use. This will also be mentioned in internal geoarchaeological site inductions as a reminder. It will be the responsibility of the Project Manager to ensure that the use of the power auger is monitored beyond even this initial period, with its application being under regular review. Such continuous review will be open to all relevant members of staff, with the Project Manager overseeing the process. This will benefit future members of staff who were not employed with the company when the power auger was acquired and introduced, ensuring that they also understand how to use the equipment safely and accurately.

Conclusion

Planning frameworks, particularly product-based planning, yield many advantages for the archaeologist. Their use allows resources to be appropriately allocated and defined, with all appropriate colleagues being consulted in turn, even in smaller scale Projects such as this one. Its collaborative nature encourages communication between different departmental groups or disciplines, allowing for smoother and more concise decision-making. It is notable in this case that the documentation created during Project Stages are of benefit in selecting the most appropriate type of power auger. In doing so, a benefit of this exercise is its transparency for all members of staff, not just those in senior roles. It is undoubtable that archaeology will not evolve as a discipline if it does not adapt to incoming technologies and ideas. The wise Project Manager uses a vast toolset, including innovative machinery such as the power auger and insightful frameworks such as product-based planning. Both are clever tools used to break new ground and shed light on the past, present, and future.

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