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MEGATROWELS AND MOTORSCRAPERS: AIMS AND METHODS IN FAST RESCUE EXCAVATION

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Over the last three decades, the rapid rate of land development in New Zealand has resulted in damage to, and loss of, many archaeological sites. Despite the Historic Places Act and the hopes held for it in the mid 1970s, it is now evident that, in the long term, many more sites will inevitably be damaged or destroyed. Many of these will be destroyed with only a meagre record of their surface features having been made.

Rescue archaeology is a responsibility of the New Zealand Historic Places Trust. The Historic Places Act 1980 allows the Trust to recover costs of an investigation from a developer, except where the development is for agricultural purposes. There is, however, a right of appeal against the level of costs imposed, which must be kept within reasonable limits. When costs can be recovered from a developer, the work can be done by contract archaeologists. However, in places like the Bay of Plenty, much site loss results from horticultural development and investigation costs cannot be recovered at all. In these situations, if investigation is warranted, it has to be undertaken with Trust staff and resources. The Archaeology Section of the Trust, however, has only very limited funds and personnel, so the style of excavation is inevitably tailored to the scant resources.

The aim of rescue excavation, as with all excavation, is the recovery of scientific data, but work must be speeded up, either to meet a deadline or to keep costs down. King (1977:369) has noted that, in these circumstances, "archaeologists ...often fail to behave in the most efficient manner because they automatically limit themselves to what they have traditionally believed to be 'correct' field methods". Archaeologists need to ask whether the methods they employ are the most efficient means of obtaining the information they need. This paper discusses some of the methods developed for fast rescue excavation by the archaeological staff of the New Zealand Historic Places Trust.

Use of earthmoving machinery

The Ruahihi excavation of 1978 (McFadgen and Sheppard 1984) followed overseas precedents by using earthmoving machinery to strip topsoil, in preparation for the detailed work of excavation. Since the Ruahihi excavation, there has been an increased use of earthmoving machinery by New Zealand archaeologists. In 1980, near Kawerau in the Bay of Plenty, a small knoll with an artificially flattened area containing a large pit was investigated (Walton 1981). The pit was excavated by hand but a motorscraper was used to strip the 0.5m overburden of 1886 Tarawera ash from the area adjacent. In the subsequent excavations at Kawerau, considerable use was made of a traxcavator to strip overburden at N77/606 and to dig trenches on adjacent slopes looking for evidence of gardening (Furey 1983, Lawlor 1983). More recently, Irwin (1985) employed a front-end loader to excavate areas on pa sites on the Poutu peninsula.

Making the most of earthmoving machinery

These examples reveal no innovative use of earthmoving machinery, only the standard practice of employing the machines to open up sites in preparation for detailed investigation. The emphasis continued to be on hand excavation with the traditional goal of "minute attention to detail" (Pitt Rivers). Even this sort of approach, however, requires more resources than are often available, so the staff of the New Zealand Historic Places Trust have extended the use of earthmoving machinery in order to stretch their limited resources. The departure from standard practice has been to use the earthmoving machinery, at the expense of hand excavation, in order to produce a broad view of the components of a site; information that is still all too rare in New Zealand archaeology.

In rescue situations, there is often no advantage to be gained by using limited resources for the detailed investigation of small areas. All excavation is sampling; even large and well-funded excavations usually uncover only part of a site and the results then become the basis for generalized statements about the whole site. The results can be misleading if the area uncovered is not representative of the whole. Furthermore, in many cases, it would be a waste of effort to produce yet more detailed plans of rectangular storage pits. In contrast, there is a place for uncovering the largest possible area to determine, in general terms, the layout and nature of the site. During this type of excavation, hard

decisions need to be made about what is to be investigated in detail and what can be noted and then ignored.

Results can often be obtained with the minimum of disruption or expense to a developer by "monitoring" his earthmoving. Monitoring may be looked upon as a form of specific data recovery (as opposed to the total data recovery that was attempted in some quarters a decade ago). It involves following the machinery and making a record of what is uncovered. There is little or no control over the machinery and little or no time to investigate features in detail. The main objection voiced overseas to this sort of excavation is that there is often too little control of context so that the excavation becomes little more than a scramble for artefacts. This need not be the case, however, and it has been demonstrated that a surprising amount of information can be recovered during the uncontrolled destruction of a site if the recording techniques are appropriate (King, Schenk, and Wildesen 1970).

In New Zealand some of the more important information recovered from sites concerns the distribution of features. Artefacts (with the occasional exception of obsidian) are rare. Monitoring is clearly inappropriate to use on some types of site but it has been used successfully on such common types of earthwork site as pa and pits. It works because the details of many commonly occurring features are already known and can often be identified without recourse to detailed excavation. Information on some structures such as houses with slight foundations will inevitably be missed. This is an unavoidable limitation of any form of fast rescue excavation. It is worth noting, however, that houses have been identified during rescue excavations because, for example, of the presence of stone-edged hearths. Occasionally there is a possibility of investigating the immediate area by hand to record details of the structure. The option of doing small, detailed excavations of some features is important as features will crop up that have not been encountered before. For this reason the Trust usually allows for a small amount of hand excavation as a condition of an authority. It is, however, preferable to have more control of the earthmoving machinery and more time to carry out detailed excavation should it be warranted. A useful distinction can be made between monitoring excavations where the earthmoving is controlled by the developer and those excavations where the earthmoving is controlled by the archaeologist and is done for archaeological purposes. Both have their place, but the latter provide better opportunities for data recovery.

Examples of fast rescue excavation

These methods were first used in three excavations during 1981-2 (McFadgen and Walton 1983, Jones 1983, Walton 1982). They are described in chronological order. Two of the excavations were monitoring excavations. Only in the excavation of N89-90/222 was the earthmoving done to meet the requirements of the archaeologists.

N78/332 (McFadgen and Walton 1983) is a terraced ridge pa in the Otara river valley near Opotiki. Two terraces on the sloping ridgetop and part of one of the lateral terraces were levelled for a house site. Topsoil was stripped by bulldozer from 1500 square metres of the site but the caterpillar tracks tended to obscure features. To improve the results, the surface of the subsoil was cleaned with a blade mounted on the rear of a rubber-tyred tractor. Over most of the site, pits and postholes which were cut deeply into the subsoil were readily seen but, on the edges of the terraces, where features were cut into fill, they lacked sufficient contrast to be identified. Houses were inferred from three stone-edged hearths. Despite the methods used, it was, nevertheless, possible to identify all the elements usually associated with domestic units, and to establish that the pa was a defended settlement.

N89-90/222 (Jones 1983) consisted of a number of pits and two terraces situated on a narrow ridgetop in the hills behind Tolaga Bay and the Uawa river valley. A bulldozer cut a section through the pits and one of the terraces and stripped topsoil from the larger terrace. The bulldozer has not proved to be particularly satisfactory for archaeological purposes but it worked quite well in this instance. No houses were identified but the pits were clearly defined. Enough data was recovered to indicate that the site was a storage area, with some shelter and cooking. This suggested that the site was seasonally occupied by a small group of people.

N129/46 Puketarata pa (Walton 1982) occupies a headland above a stream near Hawera in South Taranaki. The defences consist of a series of closely-spaced transverse ditches and banks and, some distance away, a single ditch and bank, which encloses a further large area of ground. Part of the outer area of the pa was required for a house site. The earthmoving, which was done by a front-end loader with rubber tyres, was monitored. The loader tended to dig into the ground and create a pattern of humps and hollows but this was found to be unimportant if the features stood out against the background.

There was insufficient time to record all the smaller features that were uncovered and effort was concentrated on recording the larger, and more readily identifiable, features such as ruas, ovens, and firepits. The initial identification was tested by observing the features as successive spits were removed. When a stone-edged hearth was uncovered the immediate area was investigated by hand to reveal a small house about 3m wide and 4m long. As at N78/332, it was possible to distinguish evidence of housing, storage, and cooking.

In each of these three examples it was possible to identify sufficient features to produce a reasonable plan of the site, even though none had been excavated with "minute attention to detail". The recording had to be fast and accurate. Two archaeologists were involved in each of the excavations and mapping was done by plane table with telescopic alidade and stadia rod. This equipment was barely adequate but could cope because the emphasis was on mapping the pattern of features rather than the detail of the individual features. The excavations were completed in a few days and the reports soon after. The limited time required for excavation and writing up are important considerations when resources are stretched. However, where more resources are available for a project, it is possible to do more, by controlling the earthmoving and investigating in detail some of the features uncovered.

Recent developments

Methods are still being refined as experience is gained. At three more recent excavations in Tauranga (U14/243, U14/2240, U14/2482) the earthmoving was done specifically for archaeological purposes. Volunteers assisted with the detailed excavation work and this has increased the level of data recovery. It also necessitated new methods of mapping. An Electronic Distance Measurer mounted on a theodolite proved to be a faster and considerably more accurate method than that of a plane table. Furthermore, the range and accuracy allowed recording to be accomplished from a single station. The survey data was fed into a small personal computer and a map produced by an attached plotter.

It is important to have some indication of the stratigraphy at a very early stage in an investigation and trenching is employed for this purpose. At Ruahihi, trenches were dug along the site and at intervals across it but at U14/2240 (McFadgen 1985), trenching was forgone so as to avoid obstructing the movement of the motorscraper. Topsoil was

stripped from 0.25 ha and storage pits, ruas, ovens, middens, a house, and two burials were uncovered. McFadgen (1985) considered in retrospect that the advantage of knowing the stratigraphy of the site early in the excavation would have outweighed the disadvantage of obstructed movement and that it would have been preferable to have dug trenches and then backfilled them before employing the motorscrapers.

At U14/2482, an area occupied by two surface pits was trenched and a motorscraper was used to strip topsoil from the adjacent part of the ridge where there was no surface evidence of occupation. This uncovered ovens and middens. Trenches dug on the northern slopes also revealed a deeply cultivated soil.

The effectiveness of earthmoving machinery for area excavation depends to a large extent on there being a colour contrast between the fill of features and the subsoil into which they were dug. As in conventional excavation, damp soil conditions tend to enhance this contrast. The contrast becomes blurred, however, where an area has been repeatedly occupied. Trenching may be of assistance but it may be possible to say no more than that numbers of intercutting features were present.

For large areas, motorscrapers are the best machines for stripping topsoil, providing they have room to manoeuvre. They have the advantage of picking up their dirt as they go along and then carrying it clear of the excavation. Motorscrapers create a pattern of strips of cleared ground separated by windrows but, in good conditions, they can leave a very clean surface that needs little further work. As with any other equipment, an experienced operator is essential.

At Ruahihi, a grader was used to strip topsoil. There were, however, problems with dirt being pushed around the site. A grader could perhaps be used to greater advantage for cleaning up the surface after a motorscraper had removed the overburden. It would give more control than the back blade used for cleaning up at N78/332 and U14/2482.

Conclusion

Monitoring, and other forms of fast rescue excavation, began as a response to inadequate resources to undertake conventional excavation: the unacceptable alternative being to let the sites be destroyed without any investigation at all. Since, however, sites will continue to be destroyed it is important that the opportunities to recover data be taken. Earthmoving machinery can be an invaluable assistance but there

is a need to develop further the techniques and approaches to be used in these situations.

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References

Furey, L. 1983 Maruka investigations, Kawerau, Bay of Plenty: final report for stage III. Department of Anthropology, University of Auckland.

Irwin, G. 1985 Pa, Land and Polity. N.Z.A.A. Monograph 15.

Jones, K. 1983 An archaeologically defined 'hamlet' (N89-90/222) in inland Tolaga Bay. N.Z.A.A. Newsletter 26:7-20.

King, T.F. 1977 An efficient method for exposing cemeteries and other complex cultural features. Journal of Field Archaeology 4:369-372.

King, T.F., R.E. Schenk, and L.E. Wildesen 1970 Audio-visual techniques in emergency salvage archaeology. American Antiquity 35:220-223.

Lawlor, I. 1983 Maruka investigations, Kawerau, Bay of Plenty: final report for stage IV. Department of Anthropology, University of Auckland.

McFadgen, B. 1985 Report on excavation of site U14/2240, Tauranga. Unpublished Typescript. N.Z. Historic Places Trust.

McFadgen, B. and R. Sheppard
1984 Ruahihi Pa: A Prehistoric Defended Settlement In The South-western Bay Of Plenty. National Museum of New Zealand Bulletin 22.

McFadgen, B. and A. Walton
1983 Rescue excavation on a pa site near Opotiki in the eastern Bay of Plenty. Historical Review (Whakatane and District Historical Society) 31:113-119.

Walton, A. 1981 A storepit site (N77/574) at Kawerau. Historical Review (Whakatane and District Historical Society) 29:71-79.

1982 Rescue archaeology at Puketarata pa (N129/46), South Taranaki. N.Z.A.A. Newsletter 25:144-150.