

**Sampling methods**  
**and sample laboratory preparation**  
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## Sampling methods: buttons, ...

### Equipment:

- ♣ Plastic discs ( $\varnothing = 2.5$  cm);
- ♣ Glue;
- ♣ Non magnetic plasticine;
- ♣ Small plate for the mixing of the glue;
- ♣ Tool for mix the glue;
- ♣ Circular spirit levels ( $\varnothing = 2.5$  cm);
- ♣ Steel knife;
- ♣ Indelible ink pen;
- ♣ Brush;
- ♣ Trowel for removing;
- ♣ Gloves;
- ♣ Plastic boxes.



Figure 1

### Fieldwork procedure:

This sampling procedure is fast and successful as well easy to take, employed on hard materials. It uses discs in natural white nylon, non-magnetic and dimensionally of 2.54 cm in the upper diameter and 2.03 cm in the lower. The upper face is flattened and roughened for the marking as well the lower face for adhering the glue.

After cleaning the feature surface utilizing a simple brush, small balls of non-magnetic plasticine (diameter of less than half cm) are placed on the top of the feature surface at each sample point, chosen according to the compaction, the stability and the dimensions of the feature and the purpose of the sampling (Figure 2). The distance between the balls is chosen such the cutting of the samples doesn't destroy the nearest one.



Figure 2



Figure 3

Each base of the disc plentifully is spread with glue (Figure 3), wearing preferably gloves, pressing down on the plasticine and left to dry. The plasticine keeps the disc from moving about and being levelled to the horizontal plane until the adhesive has set.

The disc is levelled with the use of a circular spirit level, supported on the disc cap (Figure 4).

After about one hour the glue should be dried and the orientation marks are written on the cap (green arrow in Figure 5) either with a magnetic compass or a sun compass: the arrow indicates North. Each disc is recorded with a progressive number.

The final operation is the cutting around of the sample possibly with a non-magnetic knife (Figure 6), usually made of steel. The shape of the cut is squared and a trowel helps to remove the sample delicately.

The samples are stored in a plastic box in order to prevent drying out and to protect the fabric of the material, and transported to the laboratory (Figure 7).

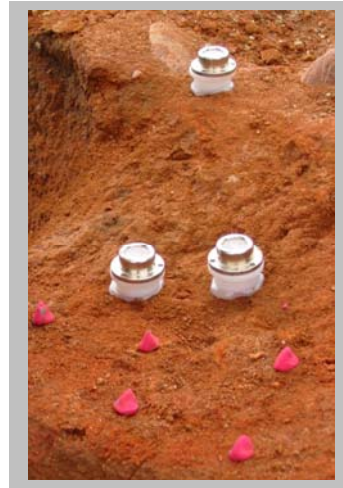


Figure 4

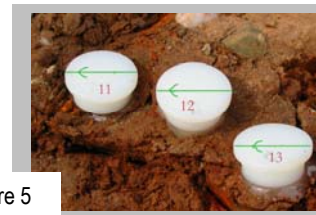


Figure 5



Figure 6



Figure 7

## Sampling methods: ...tubes.

### Equipment:

- ♣ Plastic tubes ( $\varnothing = 2.5$  cm, height= 2.5 cm);
- ♣ Glue;
- ♣ Trowel;
- ♣ Circular spirit levels ( $\varnothing = 2.5$  cm);
- ♣ Indelible ink pen;
- ♣ Perspex plate;
- ♣ Brush.



Figure 8

### Fieldwork procedure:

The sampling by tubes is employed especially for soft materials. It uses tubes, made of non-magnetic materials, as nylon or plastic, and with the diameter of 2.50 cm and the height of 2,50 cm. The rim is sharp and slightly smaller in diameter than all tube as this geometry helps to cut the materials around during the pushing. The cylinder base has a small hole to allow the drying out.

After the cleaning of the feature surface utilizing a simple brush, the tubes are positioned over the feature with the open base down (Figure 9). The distance between the tubes can be very small but it is advisable to be not less than 3 - 4 cm such that extracting one sample doesn't destroy the next one.

The tube is pushed into the materials. In order to push vertically the tube, a round spirit level is mounted over the upper base of the tube



Figure 9



Figure 10



in order to set an horizontal surface on the tube (Figure 10). It may be helpful the use of a Perspex plate, positioned between the tube and the spirit level. The spirit level has the same diameter than the tube. The tube has to be pushed completely for its height and it is also opportune do not move around the tube during the pushing down as the fabric can be disturbed. The orientation marks are written down on the cap (black arrow in Figure 11) and each tube is recorded with a progressive number. The arrow has the end directed towards the North.

The final operation is to cut the sample around the tube using simply a trowel (Figure 12).

After the removing, the tube lid is sealed with a commercial and non-magnetic glue (Figure 13).



Figure 11



Figure 12



Figure 13

## Sample preparation in laboratory

### Equipment:

- ♣ PVA (Polyvinyl acetate): 3 g;
- ♣ Acetone: 10 ml;
- ♣ Glass cylinder;
- ♣ Glass receptacle;
- ♣ Small bowl;
- ♣ Pliers;
- ♣ Glass rod;
- ♣ Safety glasses;
- ♣ Gloves.

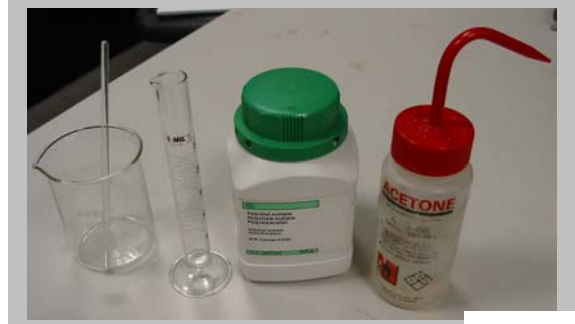


Figure 14

### Laboratory procedure:

The sample, collected with the button methods, are cut in a regular shape before consolidation if necessary to ensure they fit into the holder of the magnetometer. The use of the consolidation is for fragile materials or if they show some cracks.

The procedure require a fume cupboard as acetone is used and it evaporates completely in few hours.

The procedure has been begun by Clark et al. (1988). The Polyvinyl acetate (PVA) is mixed in a solution of 10% with acetone to obtain a PVA emulsion.

The emulsion is prepared in a fume cupboard such the fumes are collected as it evaporates during the drying from the emulsion (Figure 15).



Figure 15



Figure 16



Figure 17

According to the procedure, 1 ml (or 3 g) of PVA the Polyvinyl acetate is mixed with 10 ml of acetone (Figure 16). With a glass rod, mix constantly the mixture until the PVA is dissolved into the solution (Figure 17).

Then the samples are suspended into the solution using a pliers, until the bubbles disappear around the sample such the porosity of it has been filled with the liquid mixture (Figure 18). The more the solution penetrate into the sample the more the consolidation is effective. Then the samples are left to dry over the night (Figure 19).



Figure 18



Figure 19

#### References:

Clark, A.J, Tarling, D.H. and Noel, M. (1988)  
**“Developments in archaeomagnetic dating in Great Britain”**  
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**“Palaeomagnetism; Principles and applications in Geology, Geophysics and Archaeology”**  
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