

PHOTOGRAMMETRIC METHODS FOR RESTITUTION OF SMALL OBJECTS EXTRACTED BY ARCHAEOLOGICAL EXCAVATIONS

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ABSTRACT

In this study an imitation of an oil-lamp, which belongs to 200 B.S. in Rome age and is made of terracotta soil, is restituted by using photogrammetric methods. The Images are taken with Nikon Coolpix 950 digital camera. Ground control points are measured with 3D Measurement Instrument in TUMOSAN A.S Quality Control Laboratory in Konya. Measurement precision is about 2 micron in X,Y,Z directions. The restitution of the sample oil-lamp shows the possibility of having an inventory of such archaeological objects.

1. INTRODUCTION

In archaeological works, which have been performed up to today, several materials have been extracted with sizes of 10 mm to 50 cm. Oil-lamps, being one of these small objects, are important ones among them. Oil-lamps being the oldest lighting device contain oil burned with a fuse. Their forms are the most important factor in the sense of age determination. In this study an imitation of an oil-lamp, which belongs to 200 B.S. in Rome age and is made of terracotta soil, is restituted by using photogrammetric methods.

2. OIL-LAMPS

The oil-lamps had been used for enlighting of caves during previous era. In this study, an imitation of such oil-lamps has been used. In Egypt, these had been used for praying to goddess Isis. Many oil-lamps had been produced for use at homes and holy places. Besides it was common to use oil-lamps as gave presents. Oil-lamps have also symbolic meanings. According to a belief, if it is not deflated, it brings happiness. Therefore, Roman People had used them as new year presents. Generally, oil-lamps had been made from glass, stone, terracotta soil, lead, iron, bronze and gold. The most common ones were made from terracotta soil and bronze. Their forms are the most important factor in the sense of age determination. Oil-lamps having many types and colors of clay and undercoat are the most common foundlings in archeological excavations.

In this study an imitation of an oil-lamp, which belongs to 200 B.S. in Rome age and is made of terracotta soil, is restituted by using photogrammetric methods.

3. APPLICATION

For photogrammetric restitution, a device that forms a point network is constructed at TUMOSAN Company (Fig.1). The control points on this device, ground control points, are measured with 3-D measurement instrument again at TUMOSAN Company. Measurement precision of this instrument is about 2 micron in X,Y,Z directions. The Images are taken with Nikon Coolpix 950 digital camera. This camera was calibrated by authors before. These calibration parameters are used on the photogrammetric restitution.

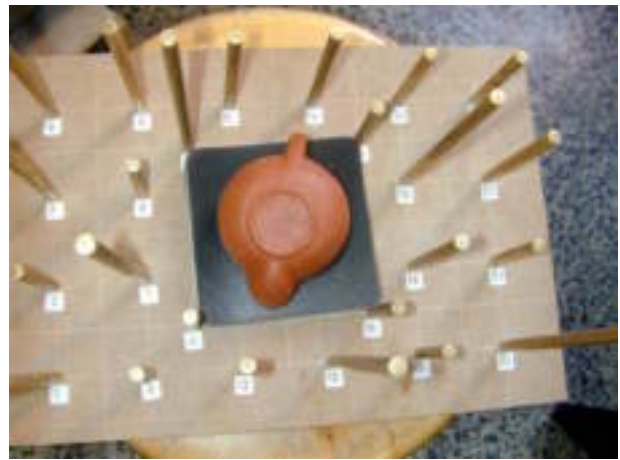


Figure.1 Device constructed at TUMOSAN Company

The front surface and the back surface of the oil-lamp are separately restituted with Photomodeler software(Fig.2). For the front surface 4 photographs and 11 control points are used. For the back surface 5 photographs and 10 control points are used (Fig.3).

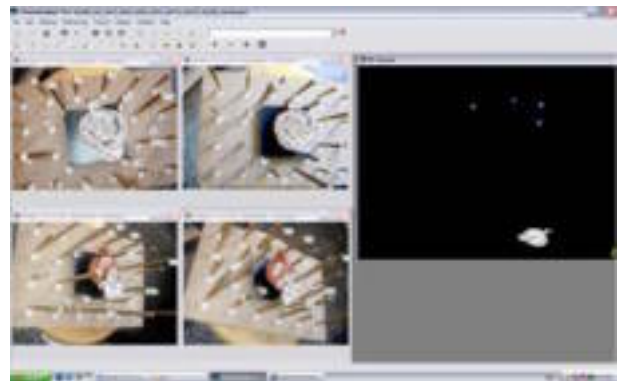


Figure.2 Phogrammetric restitution of oil-lamps at the Photomodeler Software

Both drawings and orthophoto of front surface are obtained at scale of 1:1 (Fig.4,5). Moreover, the back of oil-lamp surface is drawn at the scale of 1:1 (Fig.6).



Figure.3 Photogrammetric restitution of the back surface of the oil-lamp

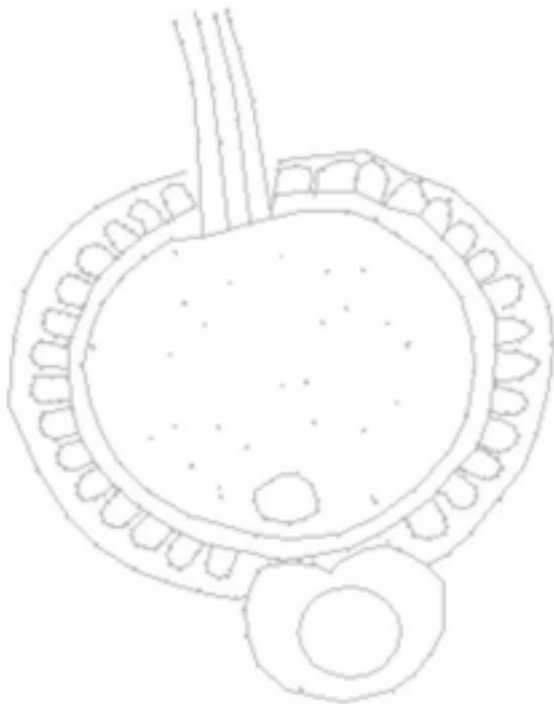


Fig.4 Drawing of the front surface at scale of 1:1



Figure.5 Orthophoto of front surface of oil-lamps with scale 1/1

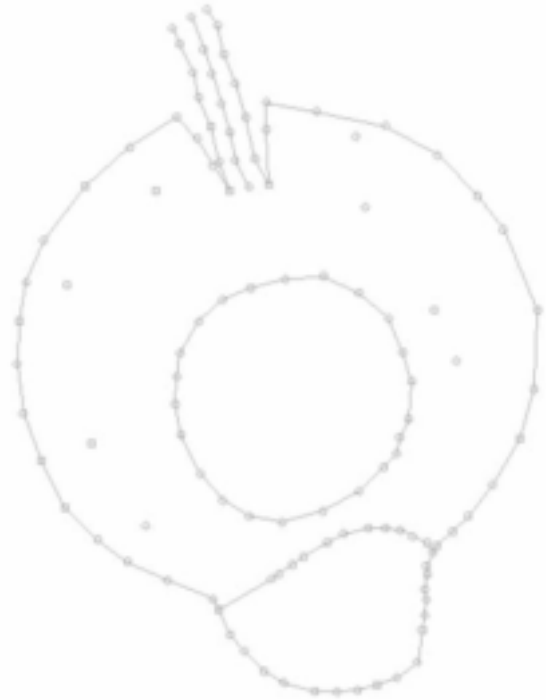


Figure.6 Drawing of the back surface at scale of 1:1

4. CONCLUSIONS

Oil-lamps having many types and colors of clay and undercoat are the most common findings in archeological excavations. Their forms are the most important factor in the sense of age determination. The drawing and orthophoto of the oil-lamp used in this study are successfully created. The complex details that can not easily be drawn in the orthophoto can easily be recognized. As a result, the photogrammetric method can be used for the documentation of small objects extracted in archeological excavations.

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