Pipe Construction Techniques in the Pre-Colombian Southwest

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Introduction

Southwestern smoking pipes in the archaeological record span a temporal range from the Late Archaic to the Historic period. Many styles have been found throughout the region. However, the most common styles are conical and tubular shaped pipes of stone and ceramic. Stone pipes in particular represent an investment simply because they can be time-consuming to construct and last significantly longer than their ceramic counterparts. This brief study shows some of the techniques that may have been used to construct stone and ceramic pipes with the tools that were available in the pre-Colombian Southwest.

Methods

For the construction of stone pipes several grades of vesicular basalt were used. Some were denser and harder than others. For shaping, pecking with hammer stones and sanding with sand stones were used. For drilling, a variety of basalt, chert and obsidian flaked stone tools were knapped into thin sections and used as drills. I obtained materials from Sentinel Mountain located above the Santa Cruz River in Tucson, Arizona and the Upper Gila River Floodplain near Gila, New Mexico. Clay and sand from the Santa Cruz River and Hopi Yellow clay formed the paste used to construct the tubular ceramic pipes.

To measure efficiency, the time to shape and drill stone pipes was measured with pecking, sanding, hand drilling, and hafted drilling. Ceramic pipe construction time was measured only for the shaping and king. After the pipes were finished, I visually inspected the use wear patterns left on the stone pipes and the tools.

Research Goals

1. To analyze the most efficient pipe construction techniques that may have been used to create conical and tubular pipes of vesicular basalt and clay.
2. In addition to finding efficient methods, an analysis of the use-wear on the stone pipes and tools was conducted to be able and recognize specific patterns that may relate to certain techniques.

Results

Table showing times to shape and drill vesicular basalt pipes. Left: Table showing times to shape and the ceramic pipes of Hopi Yellow Clay and Santa Cruz River Clay. Above: Table the times to shape and drill vesicular basalt pipes. Right: Table showing times to shape and drill vesicular basalt pipes. Above: Table showing times to shape and drill vesicular basalt pipes.

Discussion

When constructing vesicular basalt pipes a variety of techniques can be used for shaping the exterior. My observations suggest that there is no single best technique that can be applied to shaping pipes. The technique is largely dependent on the type of stone. Two of the four stone pipes were destroyed in the process of construction as a result of improper pecking. Soft vesicular basalt, especially when pecked at an angle, can flake in a similar manner as any siliceous material. Furthermore, pecking with too much force can have the same effect.

Drilling is difficult by hand. One must peck with the drill bit and twist to provide both the penetration and outward force to widen the hole. No single method alone can provide an effective drill. As with VB4 before its destruction, a hafted drill bit can better provide both. It is easier to provide downward force on the drill shaft and provide a much faster rotation using a fire starter technique (rubbing the stick rapidly between two hands). The disadvantage to this is that it requires more advanced knowledge on flaking stone tools. One must flake a drill bit that is able to be hafted, which is difficult and similar to producing a projectile point. Otherwise, drills only need be roughly conical in nature.

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