



Replicating a Prehistoric Masonry Room at Tuzigoot National Monument



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Introduction

Tuzigoot pueblo (AD 1125 – 1400) has a nearly 85 year history of ruins stabilization, resulting in 25 different stabilization mortar types and nearly as many methods of application. In 1998, Tuzigoot National Monument set forth on a program of removing previous stabilization materials and replacing them with a standardized soil cement. While the underlying stabilization goals have remained the same for Tuzigoot pueblo, the underlying practice of ruins stabilization has evolved based on the preservation crews fundamental understanding of the nature of the structure. This poster highlights how the building of a masonry reconstruction of a typical Southern Sinagua structure helped provide insight into how prehistoric builders would have planned and implemented complex construction projects. Developing this understanding shaped a unique perspective on the material and labor investment needed and the inherent environmental impacts that come as a result of large scale construction.



During stabilization using the technique of tuck pointing.



After stabilization using the current mortar mix at Tuzigoot National Monument.



Using a tuck pointer to push in the mortar. During the construction of the Replica pueblo.

Background

Located in the Verde Valley of Central Arizona, Tuzigoot pueblo consists of 86 terraced ground-floor rooms with an estimate of between 100 – 110 rooms on two or three levels (Hartman 1976:42). The earliest occupation of Tuzigoot pueblo dates to the Camp Verde phase (A.D. 900-1000/1125) and was occupied through the Tuzigoot phase (A.D. 1300-1400) (Hartman 1976:37). The population of the site grew dramatically as the population in the Verde Valley peaked around A.D. 1300. The site is one of many large hill top pueblos in the area and includes a clear line of sight to nearby pueblos and the surrounding landscape.

The Southern Sinagua used local limestone and sandstone as well as local clay from various construction events of Tuzigoot pueblo. Caywood and Spicer (1935:15) divided the rooms of Tuzigoot pueblo into six groups “for the purposes of field supervision,” and “were arbitrarily selected and bore no relation to the chronological positions of the rooms.” Powers and Pearson (2008) explain that prehistoric occupants of the pueblo likely used, as living quarters, ceremonial spaces, and storage areas, most of the rooms throughout the entire occupation of the pueblo.

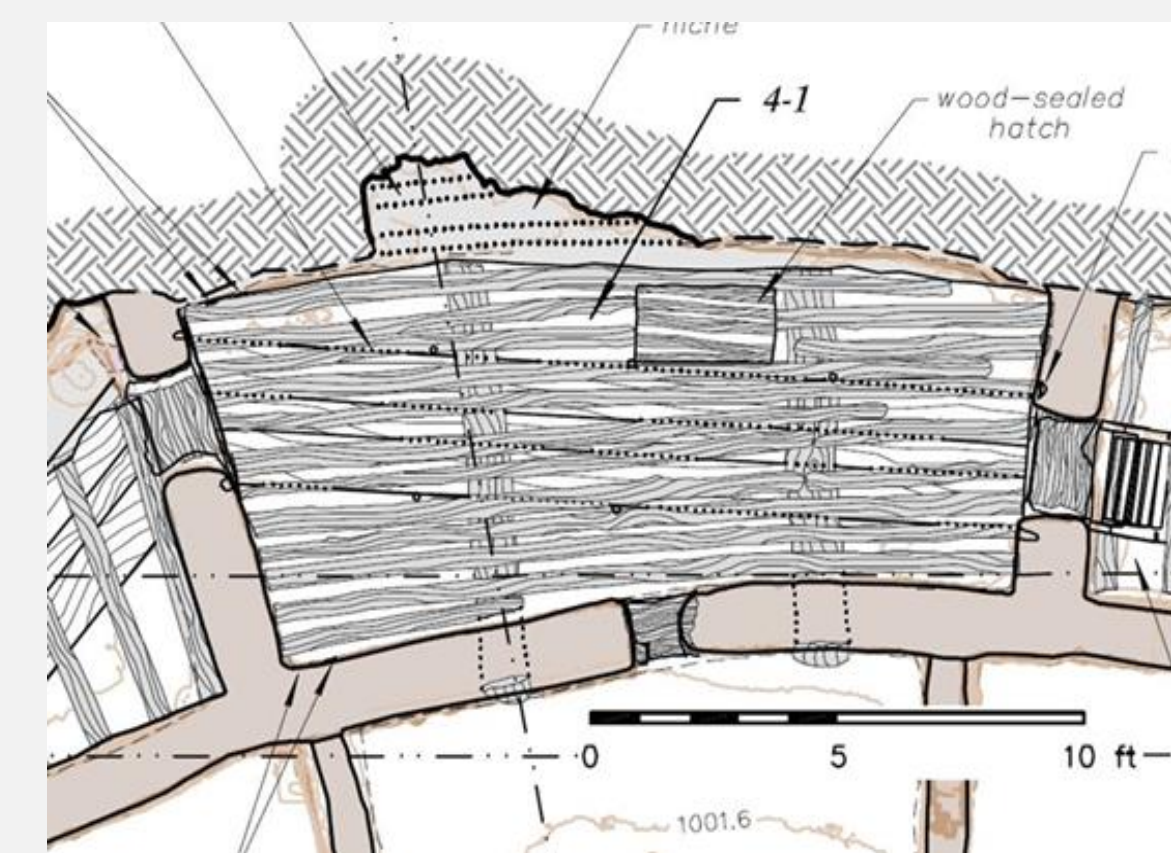
Unlike nearby Montezuma Castle, which was heavily damaged by looting, Tuzigoot remained obscure to the populations in the Verde Valley in the late-nineteenth and early-twentieth centuries. Although the site was undoubtedly disturbed by looters, it remained largely unnoticed until the 1930s. Louis R. Caywood and Edward H. Spicer supervised the excavation and stabilization of Tuzigoot pueblo between 1933 and 1934. Since the initial excavation, Tuzigoot pueblo has undergone several stabilization projects.

Established as a National Monument on July 25, 1939 by President Franklin D. Roosevelt (Richert 1953:1), Tuzigoot has experienced several excavation and stabilization projects. Louis Caywood and Edward Spicer conducted the first extensive excavation of the pueblo in 1933. Several excavation and stabilization projects followed and included work completed by Cotter (1940-42, 1947), Richert (1953), Shiner (1961), Voll (1964), Mayer and Waggoner (1968), Western Archeological and Conservation Center (1983), Ruben et al. (1992), and Schroeder (2007) (Schroeder et al. 2007:3). Stabilization work continues to this day.

Project Objectives

1. Replicate a Southern Sinagua structural component in its entirety to provide park staff an opportunity to train and develop skills in understanding how these structures were constructed.
2. Assess masonry construction and repair techniques at Hopi for comparative analysis.
3. Incorporate both methodologies into developing best practices for future ruins stabilization.
4. Utilize structure as an experimental archaeology testing facility.

Methods



The foundation which was dug between 1-1 1/2 feet in depth.



Throughout some of the building process the mortar was thrown into the joints as shown.



Notice the different styles of building. The ramp was split into two projects until the ramp.



The stones were used as leveling for the floors. Notice the height of the stones.



Construction of the east entrance. The lintels were tied at both ends with the cordage at the top left of the photo.



The morning after the entrances were completed.



Black willow logs were used for the primaries. They have a similar density to the sycamore, which were used in Montezuma Castle.



Overview of the roof beams. The secondary's were installed.



Weaving of the reed matting.



Overview of the roof once all the reed matting was laid out.



During the final step of roof construction.

Results

In total, construction of a single scale replica room took an enormous amount of materials and labor to construct:

- Roughly 1, 046 stones were used in construction.
- A minimum of 1088 gallons of mud mortar was placed between the stones.
- 2 – 12' primary beams weighing several hundred pounds each were set.
- 22 – 10-15' Secondary beams and 10 - 4' x 6' woven reed mats.
- Approximately, 1032 gallons sand/mud roofing material was used.
- 90 gal of mud was used as a leveling coat on three walls.
- 70 gal of mud was used as finishing coat on two walls.
- In total, 1407 man hours went into the construction of the replicate structure.



Prior to any plastering, many tests were conducted. Notice the two test patches at the east side of the entrance and at the corner.



After the final layer of finishing plaster was applied.

Discussion

By re-examining and reconstructing the replicate structure, as well as incorporating traditional construction techniques from pueblo cultures we were able to gain an in depth insight into how these structures were originally constructed. We can then extrapolate that information and skill set and apply it to future preservation and stabilization work. Work that is more reflectively of how the prehistoric structures were originally constructed. There is no need for a heavy handed approach when the original construction and repair methods may prove to be the best method for preserving these prehistoric structures into the future.



The masonry construction from a room at Hopi.



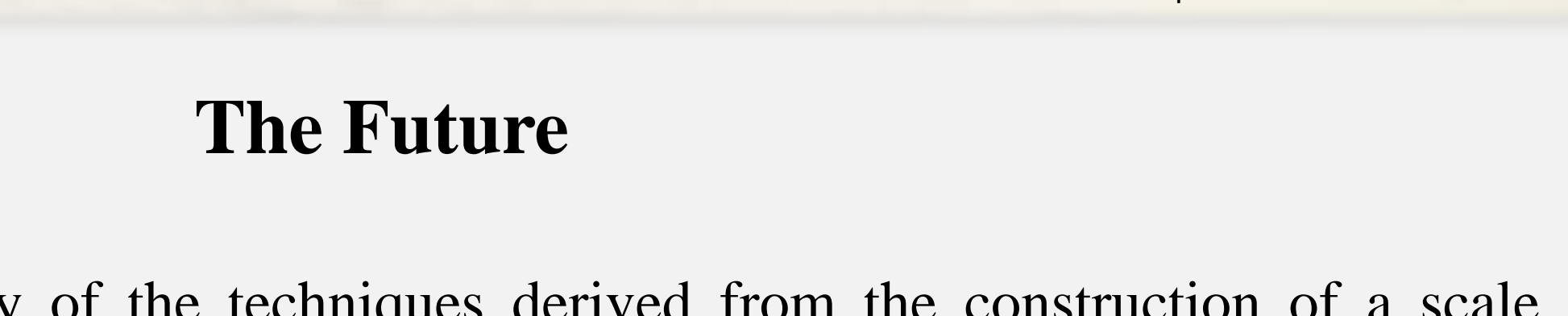
Masonry from the replica room.



The traditional roof construction out at Hopi.



Roof construction from Montezuma Castle. The roof construction at Tuzigoot National Monument would have been very similar to those pictured.



The roof construction of the replica room.

The Future

While we can implement many of the techniques derived from the construction of a scale replica pueblo in the ongoing stabilization and preservation of Tuzigoot and elsewhere, there are still many unanswered question that developed along the way. Ongoing testing at and on the structure may provide better insight into not only prehistoric construction logistics, techniques and technology, but also life living in one of these structures.

The Verde Valley is ever evolving, but by taking a step back and truly examining the how's and why's in construction of the prehistoric places located here we are able to determine the best methods to best care for them and preserve them long into the future.