

Byzantine Adobe

1500 year old technology comes to Northern New Mexico

Adobe. It's a simple word which has developed a variety of meanings. In trendy communities, 'adobe style' means a frame structure with Structolite plaster, usually in some degree of the color brown.

The fact that it is called adobe style, is purely and aesthetic issue and has nothing to do with the stability of the building or its natural ability to retain heat in the winter or maintain coolness in the summer months. It's just like any other frame structure and is usually built on a cement slab.

Adobe can also mean a structure where the four walls of the building are load-bearing, made from adobe mud bricks which have either been stabilized with asphalt as in more recent times, or with non-stabilized adobe blocks as was often the case in the past.

These authentic adobe structures require deep cement foundations with adequate rebar to prevent cracking from the ground

upheaval when temperatures drop below zero degrees. Failure to do this invites structural problems down the road.

In the winter of 1990, we remember all too well when one night the temperature outside dropped to 22 degrees below zero here in Los Silvestres.

We were thankful that we were living inside 26 inch thick adobe walls built in the early 18th century in the *jacal* style with the vertical sticks and stones incorporated into the structure.

True adobe structures are cool in the summertime, reducing the need for obscene electric bills for air conditioning as well as the noise pollution that goes with most systems.

If natural rays of the sun are allowed to penetrate the rooms during the daytime hours with big windows, the walls of adobe structures absorb that heat naturally and then emit that warmth in the evening, perhaps accompanied with radiant heat in

the floor or a wood burning stove. We prefer both.

In the winter months we keep the temperature of the radiant heat around 50 degrees to conserve energy. We really enjoy the practice of burning cedar and piñon wood on chilly evenings and the aroma is therapeutic. When you have several cords of wood going into the winter, you have your own little stash of homeland security.

Lastly, the word adobe can also mean the adobe brick, dimensions which have been set at 10" x 14" x 3.5" thick.

Not long ago, Northern New Mexico College Professor Quentin Wilson, who teaches classes on adobe construction at the El Rito campus, visited Istanbul, Turkey. He visited Hagia Sophia, a dome structure that was started by the Byzantines in 532 A.D. and completed five years later.

As a Christian, Emperor Justinian wanted to build a house of worship to replace Constantine's basilican church in the then Constantinople. It had burned to the ground and he wanted the new building to last forever.

When Wilson saw the 1500 year old technology utilizing *pendentives*, which is the constructive device that permits the placing of a circular dome over a square room or an elliptical dome over a rectangular room, he said to himself, "We can do that."

Back in New Mexico, He created the course *Arches, Domes & Vaults* at the college in El Rito. The half a dozen dome structures that have been built to date, utilize the same technique first developed by the Byzantines 15 centuries ago.

On May 1st, 2006 in Los Silvestres, an agricultural community three and a half miles north of the village of Abiquiú, on land owned by the principles of this publication, Quentin Wilson's class began the build the largest and tallest domed adobe to date in Northern New Mexico. What was more amazing was the fact that the Byzantine structure was completed in just.... ten days!

When finished, the structure would stand 16 feet 9 inches high. Participants on the project came from as far away as Erfurt, Germany, New York City, Phoenix, Colorado Springs and Berkley, California.

The bulk of the students and friends during the two week period were from Northern New Mexico. The photos which accompany this article will enable you to understand the process of building an adobe structure as well as a dome, the technology of which is 15 centuries old!

In our parochial school upbringing, we were taught the importance of having a solid foundation with respect to faith.

We also apply that thought process to construction. Build an adobe structure which rests on top of a deep and solid foundation, and there will never be any regrets in the future.

After the site was selected, a foundation for the adobe dome was excavated two and a half feet deep by two feet wide and lined with sufficient rebar in the 'cage style'.

When ordering the load of cement, we decided to plan for a monolithic pour, which would add to the stability of the adobe structure as well as preparing the floor for flagstone after completion of the dome. Our foot print would be 12.5' by 12.5'.

From the owner builder vantage point, it is most propitious to pour concrete in the late winter

if at all possible to minimize the cost of cement as local prices jump 10% to 15% on April 1st of each year. We poured our foundation March 30th.

The week before the construction started, we took delivery of the adobe from Mel Medina's Adobe Factory in Alcalde. With 75 blocks to the pallet, we were able to calculate how many to order and then have the pallets carefully placed around the foundation leaving room for scaffolding and the movement of 10-15 people on each of the ten working days.

One had two choices for laying a single story adobe wall or structure, either ten or fourteen inches thick. If you've gotten this far into this article, you probably have already figured out which option we took.... the latter. We wanted greater stability for the structure as we have observed too many walls and buildings fractured and cracked in Northern New Mexico because the property owners wanted to "save money" and/or didn't know any better. Enough said.

Framing in the windows and door is fairly easy for any owner builder and having a degree in rocket science is not required.

Guideposts and guidelines for each row of adobe are important. That old saying from our time in the military service rings true when building, especially with adobe. It is... *proper prior planning prevents poor performance positively*. If you build a crooked row of adobe, you will end up with a crooked building for all to see. Taking the time to insure straight walls pays big dividends down the road.

On Monday, May 8th we were ready to pour a cement bond beam. The top of the square level was 11 feet and we wanted insure no one would be injured by stepping on a 35 pound adobe and have it break off, casting them to the ground below. In addition, we felt a cement bond beam would help bind the entire building together in the event of an earthquake or flooding from the arroyo nearby. Prof. Quentin Wilson calculated the weight of the cement would be in excess of 6,000 pounds, and if we hauled five gallon buckets with approximately 30 pounds in each up the ladder, some of our students and other participants might not return for the rest of the week.

So, for a few hundred dollars, we hired a pumper to shoot the cement to the top. The process took less than a half hour and saved a great deal of energy and grief.

On the seventh day a stick located directly in the middle of the dome indicated where each adobe was to be placed, just like in the time of the Byzantines who obviously used a branch from a tree.

What followed during the last four days, is something we shall never forget. The intensity of the project accelerated as we all began to see the completed dome within our grasp, if we stuck together as one human mass gradually building and advancing to the top of the dome.

Because of the space constraints of this publications, we have decided to continue the story of the *Dome at Los Silvestres* in our next edition, the winter issue and at that time make the hundreds of color photos of this entire process available to you online with a slide show for your pleasure.

Richard Bock, editor of this journal, has been a resident of Abiquiú since 1990. He is co-steward of the historical Plaza de Los Silvestres (1734), a shepherd and Registered Principal with the NYSE.