

Conservation of the *Abi* at Urkesh: the years 2013-2017

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The *abi* at Tell Mozan is a unique architectural structure: a subterranean building, made of massive stones, with a distinctive plan characterized by a circular and deep main room, which one could access only through a narrow and steep stone staircase. The original structure, built at least in the third millennium B.C., continued to be used throughout the second millennium as well, albeit in a less monumental fashion.

The *abi* represents a marker of identity for Hurrian culture, that characterizes the whole site of Mozan: today, it is the only known ‘witness’ which provides archaeological information on the rituals performed by the king and the queen who could, through this, contact the Netherworld. The importance of keeping the structure safe and accessible (by visitors as well as scholars doing further research) was clear from the beginning: thus, a great effort has been put by the archaeological expedition in this respect, and the whole structure has been always covered and protected.

2013

Until September 2013, the *abi* was protected with the same protection system as the rest of the Palace: it had, thus, a curved, dome-shaped, metal structure above it, and this was covered by a layer of tarp. However, this covering constantly suffered damages caused by the wind and heavy rains, which tore off the textile more severely than with the mud brick walls of the Tupkish Palace, where the same system had been applied.

The possible strategies for covering the *abi* were discussed by the archaeological staff together with the local workmen, and they resulted in four possible solutions:

1- Replace the old with a new tarp, to be used on the same metal frame that had been in use in the past years, but covering it with mud plaster, in order to preserve it from atmospheric agents and to avoid the damages caused by water and wind. This would have been the least expensive solution, and it would have maintained the dome-shaped structure which, according to our reconstruction, was atop the *abi* when it was in use (thus giving to modern visitors a clear perception of how it looked in the past as seen from the inside). Moreover, the final result would have been very similar to the rest of the covering system of the Palace. This option had the disadvantage, however, of being once again only temporary, in need of constant maintenance since the natural elements used to cover the curtain could deteriorate very rapidly; in addition, mud plaster would not easily have adhered to such a curved surface.

2- Take the semi-circular metal structure off and cover the *abi* with flat metal plates that had been used in the past for various ad hoc equipment on the excavations, and that possibly were still on the site ready for the workmen to use. The metal sheets would have to be covered in plaster, in order to avoid rusting and water seepage during the rainy season, or on the contrary, over-heating inside the *abi* during the hot months. In this case, the perception of the original shape of the structure as seen from the inside would have been lost, but the materials used would have been more long-lasting and they were already *in situ*, thus providing a quick and almost inexpensive solution to the problem.

3- If the metal plates for the option discussed above were not available any more, wooden beams could have been used in a similar manner, covering the circular perimeter of the *abi*. This would have been a more natural solution and would have avoided over-heating inside the structure; wood is however more vulnerable to water and humidity, and it might have needed frequent replacement. Moreover, given the difficult political and social situation in the country during the Fall 2013, wood was also quite expensive and hard to find.

4- The last possible option that we considered was to cover the *abi* dome entirely with new metal sheets, as light as possible, so that the complete structure could still be moved without too much difficulty. This structure would then be plastered, or painted in the same color as the Palace bricks, in order to protect it against rust, to avoid over-heating, and so that it would be as unobtrusive as possible in the general landscape. This would have been the most expensive solution because of the materials used and the need of hiring a professional smith to perform the task; however, it had the advantage of being the most long-lasting one, and of preserving at the same time the original shape of the covering of the *abi*.

Preparatory and Implementation Phases

The last solution, the creation of a new metal dome, appeared from the beginning the most preferable one, because it would have ensured the best protection of the *abi* and at the same time it would have been easier and cheaper to maintain in future years, even without the presence of the expedition staff at the site.

We needed to be sure that the metal sheets were light enough to ensure the removal of the complete dome when necessary – possibly with the use of handles, to be placed at the bottom of the structure. Some light needed to reach the inside of the *abi*, therefore we considered the installation of glass or plexiglass panels at the base, that could if necessary also be removed to allow for ventilation in summer.

Almost a month passed between this first planning phase and the beginning of the work: this delay was due to various reasons. First, the Eid and the festivities connected with the end of the Ramadan kept our workmen at home, celebrating with their families. In addition, telephone lines in Syria were often not working, and this made it hard to contact Sabah Khassem in order to plan the job and to give him instructions for the beginning of the work.

Finally, in the last week of October everything was ready, and the project had been discussed both in its practical and economical terms (concerning the costs of the materials and for the labor); moreover, the former photographer of the archaeological mission Diadin Albek had been contacted, in order to ensure a full photographic coverage of all the phases of the work. Moreover, we asked the smith Sabah Khasseem to compile a journal on a daily basis of his work in Mozan, thus providing at the end a complete report.

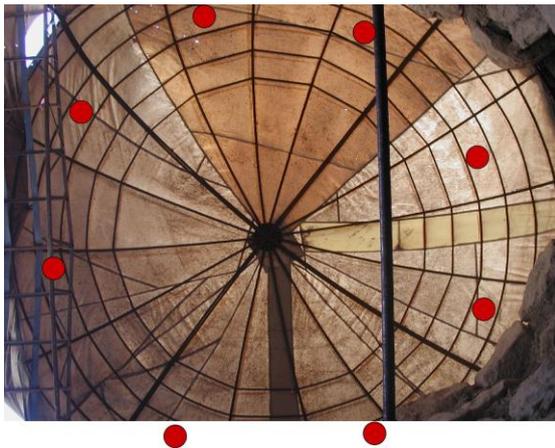


Fig. 1: Photos with the indication of the openings to be created in the new metal dome for aeration and light inside the *abi*



Fig. 2: First day of work on the *abi* dome

Once started, the job went very fast. Hiba Qassar was able to speak with Sabah on the phone while he was working on the structure and we could thus get a hint of the progress of his work.



Fig. 3: Sabah Khasseem at work (left) and detail of the openings at the base of the new *abi* dome

On December 9th, 2013 workmen had to interrupt their work because of the weather: the dome structure was ready and painted, but a few final details, such as the application of metal nets to the openings, were still needed. Cold and snow however were such that Sabah preferred to cover the entire structure with plastic sheets and wait before completing his task. In the meantime, they sent us a complete report with several detailed photos of the work they had done until that moment: this allowed us to evaluate the first results and to compile an initial record on the effectiveness of our intervention.

The interruption was however longer than originally planned, and we were able to go back to the work on the *abi* only one year later; being completely covered in plastic, throughout this period the structure remained protected even if the project was still not in its final form.

2014

The dome was not the only part of the structure that required a new protective system. At the beginning of 2014, when the rest of the structure had just been renovated and was thus well conserved, we were warned that a particularly heavy snow had put the entrance of the *abi* at a

risk. Therefore we started to consider the possibility of modifying the roofing system of the frontal part of the structure, as well.

In May 2014, we asked for a complete assessment of the situation from our workmen in Mozan. We received a new complete set of photographs, together with a video in which the local guard of the site, Mohammed Omo, gave us a brief report of the work they had done, his impression on the current situation of the dome, and his personal advice (as a person who could check the situation *in situ*) on what was left to be done.

The ventilation openings for which we had asked in the new structure were working well, preventing overheating and allowing some light inside the *abi*. Three small openings have been left at the bottom of the dome, at its southern and south-western sides: these are rectangular in shape, and covered by a metal net to prevent animals and any other external elements from entering the structure.

Each one of these openings has a thin metal sheet on its top, which is tilted upwards and slightly longer than the holes themselves: this has been done for a specific reason. As can be seen in the photo, these unobtrusive installations create a kind of small drains, so that rain is channelled and seeps out, preventing the water from leaking into the *abi* (Fig. 4).



Fig. 4: Showing the openings and the drains above the openings

When they had been put in place, the metal sheets of the dome were slightly overlapped each other, and held together with screws. Although this resulted in a very secure structure, there were still some spaces between the junctures; thus, the workmen decided to fill those gaps with silicon, which ensured maximum protection against rain and dirt.

Once the dome was in a very good shape, we paid closer attention to the roofing of the *abi* entrance. While we began to plan the renewal of this last part of the structure, we also decided to run a test on the finished covering system. Our goals were:

1. To prevent the formation of rust on the metal sheets, minimizing the effect of weather conditions;
2. To provide the dome with a more natural look, that could blend with the surrounding structures of the palace as well as with the whole site.

In June 2014 the team resolved to try two different methods that the workmen put in place right away. The first one was covering the dome with adhesive and then applying a light layer of fine dirt directly above it; the second was to cover the structure with adhesive and then place burlap on it.

The dome was therefore completely covered, but using the two methods – each for one half of the structure: half was covered with dirt (Fig. 5a), the other half with burlap (fig. 5b). Initially, both methods seemed to give the dome a very natural look and to be unobtrusive with regard to the surroundings (Fig. 6). However, we had to observe how the two systems reacted in a longer period: thus, we asked our workmen at the site to look carefully at the dome in the following months in order to check how the covering system reacted to the atmospheric agents and in general to the passing of time.



Fig. 5: Covering half the dome with dirt (5a, on the left) and the experiment with burlap (5b, on the right)

After a period of observation, we determined to use the burlap for the entire dome – substituting the half covered with dust whenever the meteorological conditions would have allowed it.



Fig. 6: The *abi* in June 2014

Roofing the Entrance

It was finally time to face the problem concerning the entrance of the *abi*: its roof was protected by a metal grid similar to the frame used for the whole palace, covered by a layer of burlap and a thicker one made of mud. Moreover, its sides were sheltered by hanging curtains.

During the fall 2013 and winter 2014, this particular system suffered a great deal and was badly damaged due to weather conditions (especially snow), plus it was dented in several places and needed maintenance to ensure an overall full protection. The workers had taken some emergency measures to stop the water from seeping in, by placing pieces of nylon in the brakeage locations. However, a serious structural intervention was needed.

The most immediate and natural suggestion was to place the same metal-sheets-covering system used for the dome also on top of the pre-existent metal frame, removing the tarp and mud. This would have ensured maximum protection and was at the same time a long-lasting solution. The smith who had worked on the dome was now living abroad but we decided to involve his assistant, who had already worked on the dome one year before and knew, thus, the kind of work that was to be done.

The work in Mozan began on December 4th, 2014.

At first, the workers removed the whole metal structure, in order to evaluate its condition and fix its damaged junctures. The parts which were dented were straightened using a hammer, and a supporting bar was placed at the central top point of the top and extended to the two bases, welded to provide extra stability and support (Fig. 7).



Fig 7: Different stages of work on the entrance

This metal frame was then placed back over the entrance of the *abi*, partly beneath the dome, and completely covered with metal sheets that were screwed into the metal frame. A small opening was made in the metal sheet, in order to interlace it with the metal frame of the dome and to ensure that it was as close as possible to it, in an attempt to leave the minimum possible space between the dome and the entrance frame. Whatever opening was left, it was later covered with metal sheets and dirt as well to ensure waterproofing.

Similarly to what had been done on the dome, the metal sheets used for the entrance cover were placed in an overlapping method, and screwed into the metal frame. Since they were

longer than the underling structure, the extra pieces on both edges were not removed, but instead they were bent to form a drain, lower than the metal frame, so that rain water would be channelled away from the stone forming the architectural structure.

Finally, the curtains used on the sides of the entrance and on its façade and doorway were replaced with new ones (Fig. 8).



Fig. 8: The *abi* in December 2014

2017

In 2017 we proceeded to a general reassessment of the situation, 3 years after the *abi* covering system had been entirely renewed.

We realized that neither of the two previously experimented system with the *abi* dome was efficient: the two halves, covered with glue and dirt or with glue and fabric, did not resist sufficiently the local weather conditions. The burlap was ripped by wind and deteriorated because of the rain and snow, and for the same reason also the dirt layer was not uniform, but patchy. The overall impression was that of a neglected situation which we obviously wanted to avoid. Therefore, we decided firstly to clean the entire dome surface from any leftover dirt or glue, and then to paint it with a color close in shade to the surrounding. This paint coat will also prevent rust form forming.



Fig. 9: Painting the dome in 2017

Our workmen from Mozan, thus, covered the entire surface of the *abi* dome with paint. The result, as shown in the photos on the left taken while the painting was still in progress (Fig. 9), is unobtrusive and

coherent with the rest of the protection system of the entire Palace Area.

So far, this solution has proved to be efficient and has satisfactorily endured the summer and fall months, and after monitoring the dome of the *Abi* for two winter seasons in 2017 and 2018, we can safely say that the painting method has been very efficient. No repainting has been needed up to this point, which proves that the approach we adopted is indeed the simplest and most cost-effective in protecting the dome of the *Abi*, according to our local staff and the periodic monitoring photos that we receive.

The minimum work that the new dome has required so far has been the refilling of the gaps between the metal sheets with silicon.