

NOTE ON THE FOURTH SEASON OF THE ITALIAN RESTORATION PROJECT IN KINGDOM SAUDI ARABIA,  
DŪMAT AL-JANDAL

Romolo Loreto, Università degli Studi di Napoli, "L'Orientale"

### *Introduction*

The 2016 restoration campaign, focused on the consolidation of the Nabataean Building A in Trench 1 (I cent. BCE - I cent. AD, excavated during 2009-2013 archaeological seasons; Charloux, Loreto 2013; 2014; Loreto 2012), was carried out between October 16th and November 4th under the supervision of the author (archaeologist), Saverio Bruno Scigliano (restorer), Andrea Marcolongo (architect) and Bruno Marcolongo (geomorphologist).

The consolidation procedure was planned in order to prevent the natural degradation processes following as much as possible an aesthetically and morphologically non-invasive criterion. A total area of about two hundred and fifty square meters was processed. In detail: one hundred square meters correspond to the mud floors of the building's courtyard and its southern room (L9); one hundred and fifty square meters correspond to the walls of the Nabataean Building A. Early Islamic structures that represent the first re-occupational phases of the Nabataean building were also consolidated. A natural, i.e. reversible, consolidating product was chosen: natural resin (Arabic gum) in hot water solution for the cohesion of the mud floors and the clay infill of the masonry stone walls. The percentage of the natural resin (from 5 to 10%) has been determined on the basis of the porosity of the treated material to improve its aggregative aptitude for an optimal resistance to the wind and rain erosive action. In the future it will be possible to determine the effective degree of preservation in order to plan cyclical maintenance treatments or test more effective chemical solutions. Finally, the preservation of the treated mud floors from the mechanical action of the rain was increased by a layer of non-woven cloths, such as the "Geodren", covering the whole mud floors surfaces.

### *Conservation Status*

Both the ancient Nabataean walls and the Early Islamic structures consist of double curtains arranged in pseudo-isodomic masonry with stone blocks held together by clay. The highest Nabataean walls slightly exceed 1.60 meters, with a thickness of 50 to 55 centimeters.

The Nabataean floor is made of a mixture of compacted mud with small stone and pottery fragments up to 5-7 cm. Finally, the Early Islamic walls still preserve the remains of white and red plaster, a mixture of sulfate and calcium carbonate known as *tin*.

During the years, after the excavations, the site was annually kept clean by removing accumulations of debris and sand. Rainwater action, sand storms erosion, vegetal intrusions and anthropic damage were observed and documented. In particular, the following damage were observed: de-cohesion and disaggregation of mud and clay, aeolian abrasion phenomena and erosion phenomena of the walls' foundation layers.

The main risk for the safeguard and preservation of the Nabataean archaeological monument in Trench 1 is attributable to the mechanical and corrosive winter rains, although not usual. The primary risks are related to:

- 1) the action of water washout that determined collapses and landslides of various material (sandy material, stones, etc.) coming both from south (from the top of the wādī al-Sirhān southern slope) and from west (from the top of the acropolis) (Fig. 1);
- 2) the corrosive rainwater phenomenon that determines the mechanical erosion of the mud and clay. Thus, a detailed hydrogeological study will be conducted in order to define practical solutions for the canalization of the water streams.

### *Consolidation Procedures*

#### Preliminary Surface Cleaning

All surface deposits (sand, debris and vegetal remains) were removed with brushes and flat brushes with soft bristles (Figs. 2-3). This procedure took place on the upper sections of the walls, on the walls façade and on the floors.

#### Consolidation Treatment

Consolidation of upper sections of the walls, walls façades and floors was carried out by impregnation of 5-10% natural resin mixed in hot water (Figs. 4-8), to improve the cohesion

and adhesion of mud and clay. Repeated treatments have been performed in order to increase the adhesive capacity and the anchorage of the masonry core and a greater resistance against the action of rainwater (Fig. 9). The efficacy of treatment with natural resin was immediately noticeable and satisfying. Obviously one has to wait at least a year to ascertain the true condition of the treated surface, since the real dynamics and environmental degradation rate of the building, still under study, is not certain.

#### Application of a Non-woven Fabric "GEODREN 200"

Over the entire surface of the floors a protective cover non-woven (Geodren 200) was placed (then covered by sand and stones) in order to protect the original mud from the mechanical action of rain and anthropic action (Fig. 10).

#### Photo Documentation for a Digital Archive

The photographic documentation related to the different stages of work was arranged in a digital archive (Fig. 11).

Acknowledgements:

Kingdom of Saudi Arabia:

Saudi Commission for Tourism and National Heritage

Republic of Italy:

Ministero degli Affari Esteri e della Cooperazione Internazionale (MAECI-DGSP)

Italian Embassy at Riyadh

Ministero dell'Istruzione, dell'Università e della Ricerca (Programma SIR – Scientific Independence of Young Researcher)

Università degli Studi di Napoli “L’Orientale” (DAAM - Dipartimento Asia, Africa e Mediterraneo; CISA - Centro Interdipartimentale di Servizi di Archeologia)

*References*

Charloux, G., Loreto, R. (2013) *Dumat al-Jandal. 2800 years of history in North Saudi Arabia*. King Fahd National Library. Riyadh.

Charloux G., Loreto, R. (eds.) (2014) *DŪMA I. Report of the 2010 season of the Saudi-Italian-French-Saudi Archaeological Project at Dūmat al-Jandal*. King Fahd National Library. Riyadh.

Loreto, R. (2012) The Saudi-Italian-French Archaeological Mission at Dumat al-Jandal (Ancient Adumatu). A first relative chronological sequence for Dumat al-Jandal. Architectural elements and pottery items, *Proceedings of the Seminar for Arabian Studies* 42, 165-182.



Fig. 1 - General view of the Trench 1 (2009-2016). In the foreground the southern slope of the *wādī* al-Sirhān; on the right the eastern slope of the acropolis. View from North



Fig. 2 - Cleaning of the Nabatean Building A floors. View from West



Fig. 3 - Cleaning of the white *tin* plaster on the Early Islamic walls



Fig. 4 - Preparation of consolidating natural resin



Fig. 5 - Boiling water for the preparation of the natural resin



Fig. 6 - Consolidation of the upper sections of the Building A walls. View from North-East



Fig. 7 - Detail of the consolidation of the façade of the Building A walls





Fig. 8 - Building A after the first complete consolidating intervention. View from South



Fig. 9 - Building A during the second consolidating intervention. View from South-West



Fig. 10 - Final protective step, placement of the cover non-woven Geodren 200. View from South



Fig. 11 - Building A at the end of the intervention. View from South