

State of the Art

Research on the Degradation of Cultural Heritage in surrounding environment

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1. The Israel Antiquities Authority

For ten years the archaeological heritage of the State of Israel has been protected and defended by the *Israel Antiquities Authority* (I.A.A.), an independent body created by the Israeli government in 1990, which took over the functions carried out up to then by the *Department of Antiquities*, founded by the English government in 1920.

The Ministry of Education is responsible for the I.A.A., but it is directed by a Board of Directors chaired by a member of the *Israel Academy of Science*, aided by an advisory council made up of expert archaeologists coming from the universities of Israel. Organised on a regional basis, the I.A.A. has the duty to apply the 1978 law on Antiquities and is competent for all matters concerning the archaeological field.

Its main duties are:

- The imposing of the obligation of protection on archaeological sites and their safekeeping
- The granting of the authorisations for archaeological excavations conducted by Israeli and foreign missions
- The direct conducting of surveys and excavations, both emergency and for research or tourism promotion purposes
- The treatment, documentation, cataloguing and collection of the finds
- The conservation, restoration, management and protection of the sites and finds
- The publication or contribution to scientific publications on archaeological subjects
- The promotion of awareness of and attention to archaeological heritage in the public opinion

In order to improve the conservation of Israel's archaeological heritage, in 1997 the I.A.A. signed a "Charter of the Policy for the Conservation of Archaeological Sites in Israel". This document has no legislative value, but is a fundamental point of reference for rendering uniform the policies of the conservation measures at the national level, and represents an instrument capable of long-term functioning.

The Charter pursues objectives of documentation, such as the drawing up of a Risk Charter of the sites, and of planning the conservation and maintenance measures, for the constant monitoring of the archaeological heritage at the national level, and to arrive at identifying the labour needs in relation to the human and financial resources available.

Furthermore, the undertakings in the conservation and restoration field conducted by the I.A.A. have contributed to enhancing the Israeli archaeological heritage and to increasing the tourism offering in the cultural sector.

As the national body responsible for safeguarding Israeli archaeological heritage, the I.A.A. guarantees that the archaeological heritage is subjected to scientific treatments and studies, on the basis of professional criteria and in observance of the Charters of Restoration and Conservation. In this sector the I.A.A. may avail itself of professionals who are highly qualified in restoration, and of experiments launched in the treatment of the various materials (for example mosaics), the graphic and photographic reproduction of the finds, and the study of particular classes such as botanical, Palaeozoic, anthropological and petrographic remains. Once they are documented and catalogued, sites and finds go into a national electronic archive that now contains around 200,000 items. For further information:

Israel Antiquities Authority

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The history of the research on Degradation of Cultural Heritage in surrounding environment in Israel is very short. Relatively short is also the existence of the Conservation Department of the I.A.A. - only 10 years. Dealing with huge number of sites (23000), big part of them on the World Cultural Heritage list and affording the problems of the protection and conservation in very corrosive environment we quickly realized the importance of the cooperation in international level. For training and research in first place because the lack of specialists in our country.

The first important international research project was the Conservation of the fresco paintings, which decorate the podium wall of the Hippodrome of Caesarea and which, was later transformed into an Amphitheater. The Amphitheater - created around the middle of the 2nd century AD by cutting off part of the late 1st century BC Herodian structure - occupies the southern third (about 90 - 115 m length) of the original Hippodrome.

The paintings, discovered in 1993, during the archaeological excavations works represent a unique example of this type of decorated surfaces, featuring several superimposed decorative schemes. These include animals depicted against a foliate background - as well as more conventional paneled ornaments and other decorative schemes.

Since its origin, in fact, the environmental conditions of the monument must have been adverse to its conservation, as the seashore is only a few meters away from the Western Wall of the Hippodrome.

The most environmental decay factors are water (from rainfall, condensation and capillary transport), thermal stresses, wind erosion, water-soluble salts from marine spray and bio-deterioration.

Research and Conservation Program of the Hippodrome fresco was built with the grateful help of experts from ICCROM, Istituto Centrale del Restauro, Rome; Courtauld Institute of Art, London; and The National Research Council of Canada.

Research on original materials - Master Degree of Israeli student in The Courtauld Institute of Art, London.

Research on the possibilities of applying protective layers of plaster (basis of the Conservation Project) - Master degree of Austrian student in The Courtauld Institute of Art, London with Pilot project and site experiments.

Research on the environmental conditions and decay factors - the program was established with the participation of the same partners.

Design of the monitoring system:

Visual monitoring - on daily basis: the Hippodrome wall was divided in three areas with conservator responsible for the monitoring. Every day a diary is fulfilled with notes for the observed problems. The observation is marked manually on the corresponding base- map and after this digitized.

Photomonitoring - on monthly basis: from fixed points rectify photography with color scale is done.

Microbiological growth monitoring - on monthly basis: visits and observation by microbiologist (identification tests if necessary).

Monitoring station - automatic registration of Conductivity (salt content), External and Internal (inside the wall) Temperature and Relative Humidity.

Aerosols monitoring - weekly basis: salt testing of exposed glass samples

Laser scanning - for future precise monitoring of the surface one section of the wall painting was scanned by the team of the National Research Council - Canada.

The result -full scale conservation project involving Conservation and Protection Plan, Monitoring and Maintenance plan, Drainage of the arena , Planning of special roofing with protection wall for the exposure of one fragment of the fresco.

The final stage of the project is in his final stage: the dead line is December 2001.

In Israel the number of sites with mosaics is around 7000. Because the importance of conservation problem and the need of National Conservation Strategy in 1997 the Conservation department of the I.A.A. designed the:

RESEARCH PROJECT ON MOSAICS

Research on the Mosaics Conditions *in situ*

BASIC SUPPOSITIONS

- A. Roofing affects mosaics
- B. Covering affects mosaics
- C. Reburial affects mosaics
- D. Lack of maintenance affects mosaics
- E. Excavation affects mosaics
- F. Conservation affects mosaics

1. Purpose of the Project:

To study:

- materials used in construction of the mosaics
- deterioration factors on mosaics
- causes of mosaics deterioration
- correlation between deterioration factors and mosaics deterioration

2. Goal: **To produce a manual of guidelines for conservation and maintenance of mosaics *in situ*, for conservators and project managers in Israel.**

3. Objectives:

To conduct a five year research project:

- pilot projects

- case studies
- statistical and analysis of data bases
- laboratory and environmental investigation
- monitoring of environmental conditions

4. Focus:

The research involves mosaics from the early Byzantine period until the late Muslim period in Israel. It does not involve newly excavated mosaics.

This program is the core of the Cooperative Research Program on Mosaics of the Getty Conservation Institute and the Israel Antiquities Authority.

A short description of one of the components the joint research project with the GCI - Monitoring and maintenance of mosaics:

The scope of the project is to study the impact of conservation treatment combined with regular monitoring and maintenance on mosaics in different conditions.

The monitoring visits are done every month and special condition and maintenance forms are filled. Every six months the condition report (done before the beginning of the project) will be revised together with new rectify photography and salt testing. Quantitative parameters measured during the maintenance are quantity of dust collected, time for repair and cleaning used, number of loosed tesserae.

The environmental data is collected with automatic monitoring station working in the site. Every observation is combined with detail's photography if necessary and mandatory overall photography from fixed points and highs.

Timetable for Monitoring Mosaics Research Project - one-year period

Operations	0	1	2	3	4	5	6	7	8	9	10	11	12
1. Monitoring visits		█											
2. Condition reports	█						█						█
3. Rectify photography							█						█
4. Overall photography	█												
5. Details photography [not mandatory]	█												
6. Salt testing	█						█						█
7. Environmental data monitoring	█												
8. Quantitative measurements [during maintenance]		█											
9. Testing control samples	█												█
10. Assessment project													█

This component of the project will give as the possibility for:

- Better assessment of the conditions of the mosaics
- Basic correlation between the environmental conditions and the causes of decay
- Indications for the effectiveness of the used conservation and protection techniques, including surface protection, reburial, fencing and roofing.
- Basic outlines for Maintenance and Monitoring Planning of Archaeological Sites with Mosaics and in general.

Other components of the project: Creation of Visual Glossary of Mosaics Conditions,

Research on materials for enhancement mosaics, Methodology for Documentation Mosaics.

The more important Research project in the recent time was the P.I.S.A. Project:

"Programmation Integree des Sites Archeologiques" (Integrated Planning in the Archeological Sites). Project of the Program EUROMED - HERITAGE. Partners of the P.I.S.A. Euro-Mediterranean Network are institutions from five countries belonging to the European Union and five from the Southern shore of the Mediterranean Sea. Duration of the project: 1998 - 2001.

General objective: contributing to the implementation of an intervention strategy shared by Euro-Mediterranean Partners, thanks to the enhancement of their policies in the context of cultural and archeological heritage.

Results: Close examination of the Integrated Planning in the Archeological Sites and specific aspects of the site's conservation, management and enhancement.

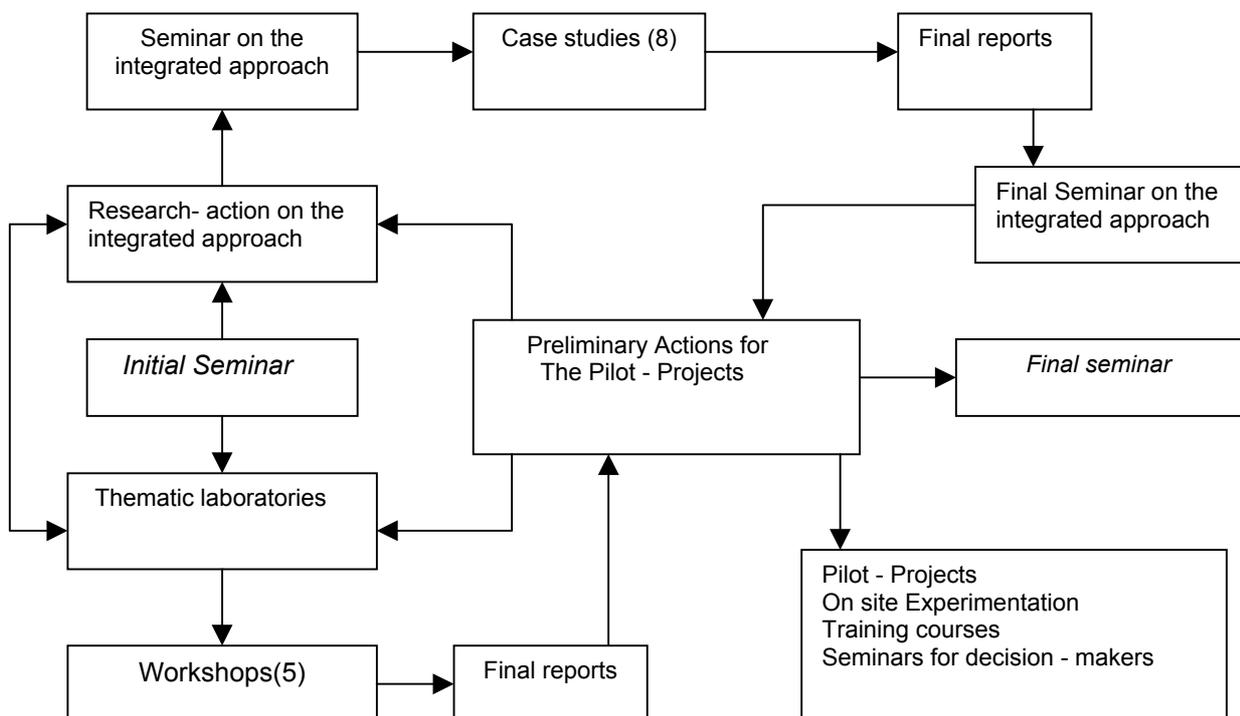
Concrete experimentation of the notion of Integrated Planning in the Archeological Sites.

Setting up Network of interested institutions in development linked to the Archeological Sites and enhancement of cultural factors.

Raising of awareness in the political decision-makers to the issue concerning the Integrated Planning in the Archeological Sites.

Raising of awareness in the public opinion as to the enhancement of the Archeological Sites and the sustainable development.

Other projects:



The theme of the Israeli Workshop was "Standards for Conservation and Safety in the Archeological sites".

The research - action was carried out by team of researchers selected in each of the countries involved in the Project.

In general every Laboratory carried -out a report working according to common methodology (see flow chart next page).

Other projects of the Conservation Department of I.A.A.

Participation in the ICP - Effects on Materials Program (from 1997).

Participation in the ITER - Project: Research on Roman Building Materials.

Projects carried out by other institutions:

Research on the pollution levels and the stone deterioration of the Old City Walls of Jerusalem - The Hebrew University of Jerusalem (1996).

