

## VIADUCT: CREATING BRIDGES FOR COMMUNICATION REGARDING SCIENTIFIC ANALYSIS

**Laura-Melpomeni Tapini**

Conservator of Antiquities and Historical Buildings, DIADRASIS Managing Director, GREECE  
lmt@diadrasis.org

**Lucía Gómez-Robles**

Architect and Art Historian, DIADRASIS Projects' Director, SPAIN  
luciagomezrobles@gmail.com

### 1. INTRODUCTION

Going back to DIADRASIS' last year's key activity one will see *"a long high bridge, usually with arches, that carries a road or a railroad across a river or a valley"*<sup>1</sup> or, simply, a VIADUCT! We designed a research project for scientific analysis in heritage and the name was selected symbolically, implying the need for a communication bridge between heritage professionals and scientists. "VIADUCT, a communication tool for scientific analysis in heritage" (Fig. 1), funded by the John S. Latsis Public Benefit Foundation Funding Programme, gave fruits in all four fields of DIADRASIS' actions of, namely research, non-formal education, awareness and publications.

The main aim of this research was the creation of comprehension tools for bridging communication gaps of different heritage professionals regarding 21 scientific analyses for the Built Heritage. For this specific purpose DIADRASIS created a research team involving an Archaeometrist: Dr. Sophie Blain, a Chemist: Ariadni Dimitrakopoulou, an Architect and Art Historian: Dr. Lucía Gómez-Robles and a Conservator of Antiquities: Laura-Melpomeni Tapini. The project was also based on the collaboration with the Coordinación Nacional de Conservación del Patrimonio Histórico (CNCPC) of the Instituto Nacional de Antropología e Historia (INAH), Mexico, the FRS-F.N.R.S. and Université de Liège (ULg), Belgium.

The communication tools initially proposed were a handbook and a website. However, in the course of the research, we realized the necessity of adding a summative poster, a two days seminar for heritage specialists and finally a workshop for the wider public.

### 2. THE METHODOLOGY

The main aim of this research was communication. Communication requires clarity and simplicity. For this reason we designed a step by step methodology, beginning with analyzing our own limits and challenges in communication and understanding, followed by designing practical communication tools of various formats.

#### Step 1: Map the needs of the different professionals

The first barrier related to the scientific analyses in question and which each research team member had to overcome was that of the proper professional conviction. It became evident already from the first discussions that each one of us was taking for granted terms and realities that were unknown to others. This helped us set the basis of the entire research, since we faced and mapped the main «dark areas» of communication. With a list of precise questions we proceeded with the second step, that of defining the context and structure of the communication tools.

<sup>1</sup> Oxford dictionary definition of Viaduct.

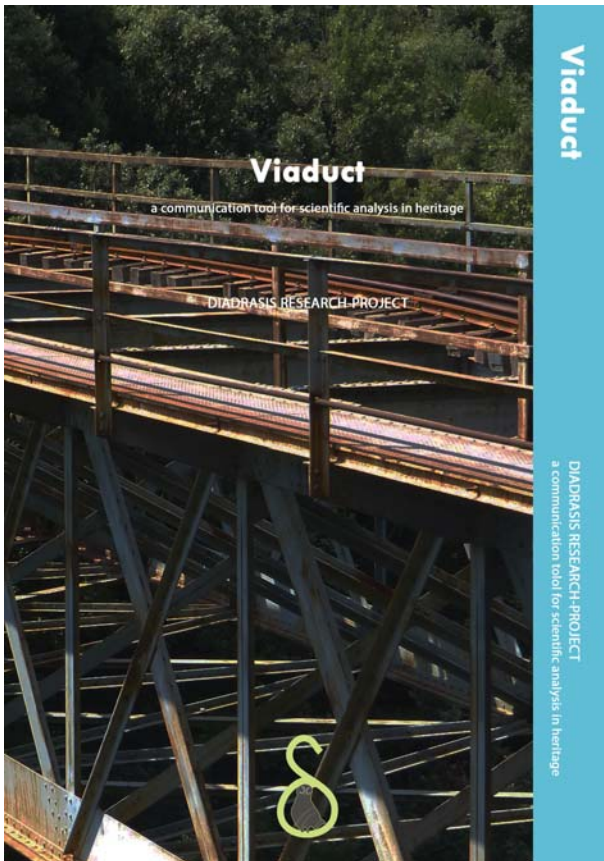


Fig. 1. Handbook cover. Image by DIADRASIS.

## Step 2: Handbook context and structure

Scientific analyses in Heritage are a wide and evolving field. We therefore needed to delimit the research by defining parameters for inclusion in a method towards «Viaduct». The parameters were:

- Applicability to the Built Heritage

- Dating and/or Characterization Techniques

- Applicability on building materials, namely stone, CBM (Ceramic Building Materials), mortar, wood, metal (iron and lead) and the pigments

- Most frequently used

As the main aim of VIADUCT was “tools for communication” we wished to make a handbook with a structure handy for the user. The core of the handbook are the 21 analyses, for which one chapter is dedicated to each. In addition, tables, diagrams, summative tables and diagrams lead the reader to search for answers according to the desired depth of information.

Tables & diagrams have been designed to help the reader with a panoramic view of the contents of this handbook so as to easily identify where one can find more detailed information:

Analyses’ type diagram, summarizing all the methods according to the type of results provided by each analysis

Material-Question table (contingency table), summarizing all the methods applicable to each material, grouped by type of question (when, what, how, where from, why [why is it altered?])

Analysis summative table for each analysis, summarizing the main information: materials, accuracy, time, cost, sampling, advantages, limitations and some quick tips. The colour reference of the table is then repeated in the following pages, where each analysis is expounded independently.

In the case of the text of the chapters the book presents 21 scientific analyses description. A detailed presentation of each analysis was prepared for its main points as to: how does it work, applicable materials, sampling process, suitable(or not) for in situ analysis, advantages, limitations, cost, duration, tips, brief example and references. For dating analysis, the in situ analysis description is missing, as it is not applicable; instead there are dated events and applicability periods.

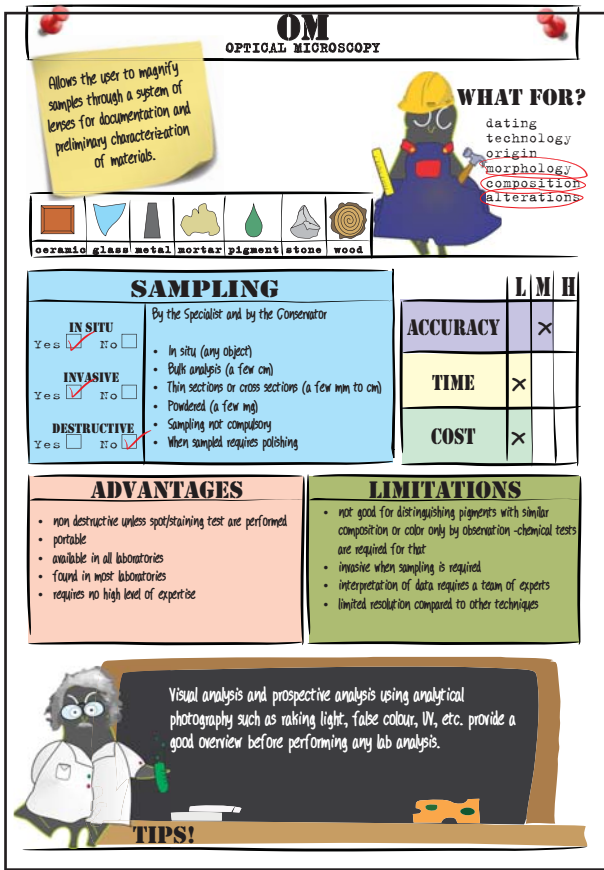


Fig.2. Example of summative table. Image by DIADRASIS.

In addition and for quick enquiries, some appendices are included at the end of the book: abbreviations, a visual glossary (with all the different results, i.e. spectra, images, graphics and a simple explanation-interpretation), a glossary (all terms marked with \* in the texts), the periodic table and the electromagnetic spectrum.

### Step 3: Definition of terminology

The last step in the structural organization of the research was the definition and clarification of the exact meaning of the terminology used for characterizing and categorizing each one of the analyses. These definitions are an addition to the general glossary and due to their importance they appear at the beginning of all the deliverables (introduction of the book, first box of the poster, first page of the website).

The terms analyzed and clarified are: in situ, invasive analysis, non-invasive analysis, destructive analysis, non-destructive analysis, accuracy, time and cost.

This step was of crucial importance as these eight terms have been the reference point for the researchers and will be the core reference for the user. Having clarified these terms we could move on to the bibliographic research for each analysis.

### Step 4: Bibliographic research and chapters creation

The bibliographic research was made through the use of all available resources, bibliographic and web. Due to the international profile of the research team we had the possibility of consulting scientific articles from Greece, Italy, UK, France, Belgium, Germany, et. al.

The chapters were written by the specialists of the team, 17 on characterization methods by Ariadni Dimitrakopoulou and 4 on dating by Dr. Sophie Blain. They were then peer-reviewed by more than 20 international colleagues (see acknowledgments). Following the peer review, all chapters have been elaborated to ensure that the texts would be comprehensible also for non-experts. The latter, the final edition as well as the drafting of the introduction and the conclusions were made by the other two members of the research team, Dr. Lucía Gómez-Robles and Laura-Melpomeni Tapini.

This handbook being only a brief presentation of the methods, it was deemed necessary to add something more for those interested in more specific data. Therefore, a reference list with both bibliographic and web resources is provided at the end of every analysis in the hard copy and at the end of each chapter as well as in the website.

## Step 5: Summative tables and diagrams design

Alongside with writing and editing of the texts we worked on designing and finalizing the structure and content of the tables and the diagrams.

The summative tables (Fig. 2) were designed as a brief identity card for each analysis, containing the basic information of the extended texts. Each card is divided into three levels:

General information containing one phrase description of each method, check box on applicable materials and a check box on the type of results.

Practical information containing checkboxes on sampling (in situ, invasive, destructive) together with a short text on practicalities of sampling and metrics on time, cost and accuracy (high- medium-low).

Finally overall considerations namely bullet points of advantages and limitations and of main characteristics and tips.

The colour reference of the summative table is then repeated in the following pages, where each analysis is explained.

On the other hand the idea of the diagrams is to help the reader formulate a clear question and make the first selection of applicable methods. There are two initial diagrams:

The Analyses' type diagram, in black and white, dividing the methods in a tree according to the type of results in different levels.

The contingency table, combining material with the core question. For easier reference the column of each material has the color of the material's icon. For non-applicable methods the box is left white, with a red x.

Another tool of the book is the image glossary which is designed as a columns table, following the order of the analysis type diagram and chapters. Each column provides brief information on:

Analysis (type and method).

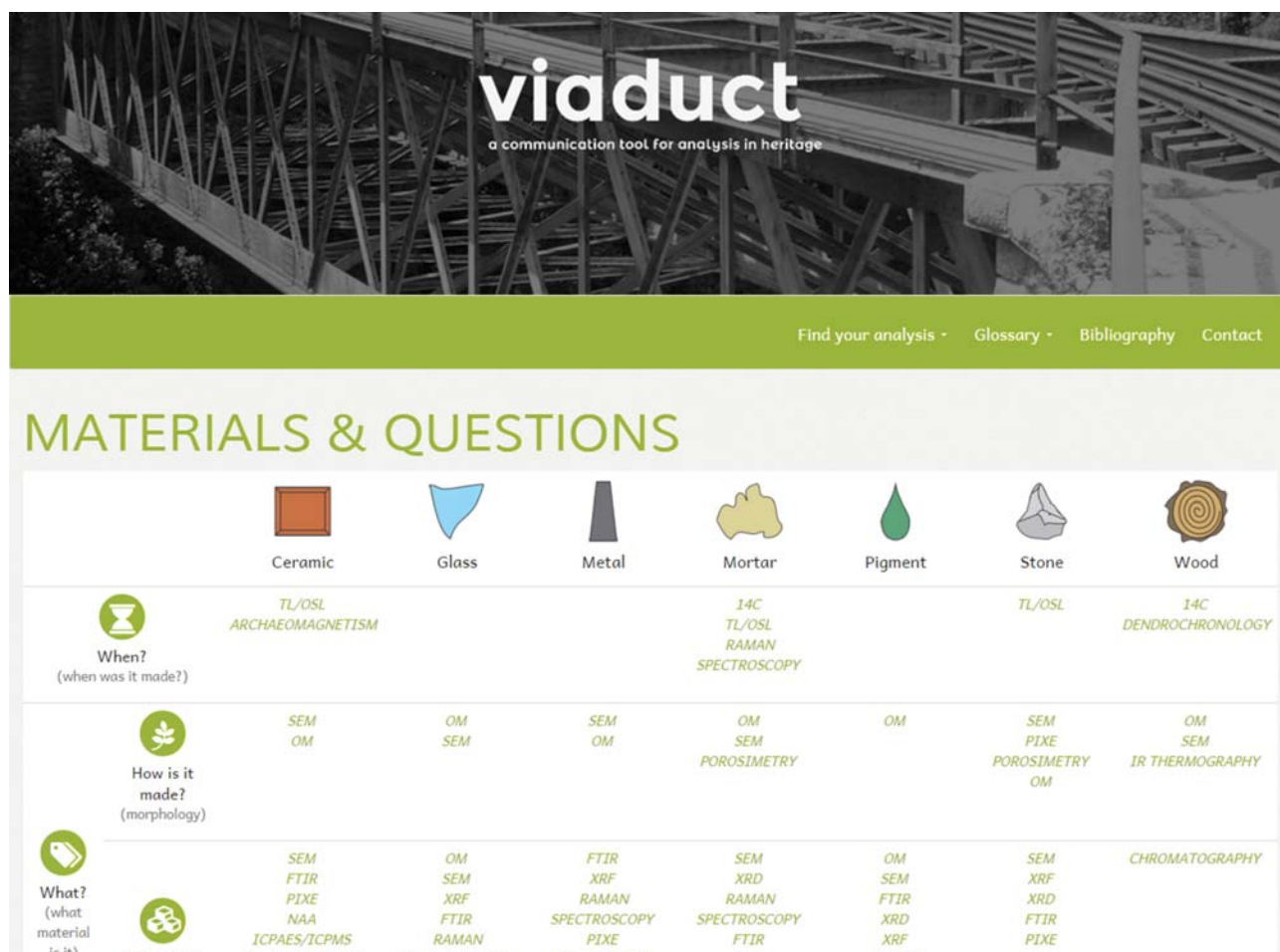


Fig. 3. Screenshot of the website. "Find your analysis by material & questions". Image by DIADRASIS.

Result, with an example in image or diagram of the results of each analysis.

Interpretation, a one sentence explanation of the type of data that can be read in the result.

### Step 6: Web design

The actual format of the web dissemination was modified from the original proposals, after consultation with the web developer. After careful analysis of the created material, the users and their requirements, the web developer suggested that the initial idea of a wiki based site be expanded with an extension for smart phones. He proposed that we rather focus on a high standard website for the data base, designed from the beginning as a responsive site for all mobile devices, as required by contemporary search engines.

The website includes all the basic data of the analysis grouped as follows:

The project section includes a description of the project, brief information on other deliverables, instructions about how to use the site, quick access button towards analyses search and glossary, terminology used, a presentation of the team members and the partner institutions.

The finding an analysis sections allows searching by name, by material/question (Fig. 3) and alphabetically.

The analysis cards are the 21 types of analysis including its name, what is it for, applicable materials, a brief description, metrics, sampling type, tips from the expert, advantages/Limitations, how does it work and references.

The glossary section contains the terminology and the image glossary.

Finally the bibliography section includes the bibliographic resources and the web resources.

The contact page offer basic information about DIADRASIS.

Overall, the website follows the structure of the book but the order and the size of information have been adapted to be more user friendly.

### Step 7: Dissemination strategy

In conclusion, more importance was given to the dissemination methodology. The real success of the project will be the wide use of the deliverables, the poster, the book and the website around the world.

Until now DIADRASIS has organised three public activities, a two days seminar called “Viaduct: do we make the best out of our analysis?” for 20 heritage and laboratory experts, an open event, for the presentation of the book and the website to the wider scientific community and a public awareness workshop called “Inspector Clouseau and the abandoned building”.

The “Viaduct seminar: do we make the best out of our analysis?” was a two-days seminar, dealing with how characterization and dating analysis can be successfully integrated into any conservation project of the Built Heritage. The main aim of this seminar was to help scholars of different disciplines understand in practice the importance of the effective use of scientific analysis, the necessity of integrating it with all context analyses and finally the crucial role of interdisciplinary dialogue, which makes the best out of each analysis. The seminar was developed with brief lectures but mainly with team exercises, round tables and discussions. It was organized by DIADRASIS in collaboration with CNCPC-INAH of Mexico and the Directorate of Conservation of Ancient & Modern Monuments of the Hellenic Ministry of Culture and Sports. Twenty participants from Greece, Germany, Bulgaria and Egypt attended the seminar.

The Workshop “Inspector Clouseau and the abandoned building” was an interactive workshop, based on the context of learning while playing, for the 1st Mediterranean science festival, held in 6/12/2015 in Limassol, Cyprus. It was designed as a tool for introducing to the wider audience the nature of the conservators’ and the conservation scientists’ work and for raising awareness on the complexity of threats which affect the maintenance of the built heritage.

### 3. LIMITS/CHALLENGES

The viaduct on the front cover is not just an image symbolizing connection or the effort to bring together all those struggling for the survival of our patrimony, our cultural heritage. It is mainly the bridge which brought us from the past, from that exciting summer seminar in the Pelion Mountains, to the future, to the interdisciplinarity where we may all speak a common language. Nevertheless the research team faced some challenges in conducting this research, mainly due to the nature of the team itself.

#### Researchers in different countries

The internationality of the team, which had several advantages, like the aforementioned access to



Fig. 4. Seminar participants taking samples from mosaics replica. Image by DIADRASIS.

Multilanguage bibliographic resources, at times creates some practical issues. The team had the possibility of meeting three times and the rest of the communication was conducted online. In the internal evaluation of the project we all agreed that at least one more physical meeting in the early stages of the research would have facilitated the execution of the project.

#### **Language barriers**

The language selected for the entire project was English. Nevertheless, as none of the four team members were native speakers of the language, we often had to rely on external consultation for the selection of the proper terminology. The clarification of the terminology was one of the working steps that required much more time than we predicted when planning the project.

#### **Overload**

All those involved in the research were getting more and more excited while developing these communication tools. Expectations grew and we all wished to add that extra 'little more' on the project, like the poster, the seminar and the workshop. In this spirit we discussed the prospect of translating the website in Spanish, as reported in the interim report. However, in a second review, we realized that that was not feasible within our time and budget limits. Yet although we withdrew this ambitious plan, we are still looking forward to a funding that will give us the opportunity to translate both the website and the book at a later time.



Fig. 5. Seminar participants analysing the historical information of the case study. Image by DIADRASIS.

#### **4. CONCLUSIONS**

Science reflects continuous evolution. Therefore, as we are dealing with scientific analysis, it is expected that what is innovative today can easily be substituted in a near future. The methods presented in the book and the website are the ones more commonly used at the moment, yet some are already evolving. New scientific discoveries are continuously offering novel tools to Archaeometry and, although the distant future might reserve extremely innovative options, current research focuses on improving already existing scientific methods. These improvements are mainly related to portability, non-invasive analysis and direct dating.

VIADUCT aimed at building bridges between laboratory scientists and heritage professionals, in order to provide the latter with basic knowledge on the potentials of dating and characterization methods applied on building materials. DIADRASIS research team hopes that this work will facilitate the work of professionals of heritage conservation, and it holds high expectations that this is a viaduct between the builders of the past and the actors of the future.

#### **5. ACKNOWLEDGMENTS**

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We are also very grateful to the international experts that embraced our project and contributed in multiple ways: general information and observations, reviews, suggestions and much more. Without them all, this handbook would not have been realized. So, special thanks go:

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