


Recording, Documentation, and Information Management for the Conservation of Heritage Places

ILLUSTRATED EXAMPLES

Rand Eppich, *Editor*

Amel Chabbi, *Associate Editor*

The Getty Conservation Institute

Front cover, *top to bottom:*

Inca earthen site of Tambo Colorado, Peru. Photo: J. Paul Getty Trust.

Detail of the *Last Judgment* mosaic, St. Vitus Cathedral, Czech Republic. Photo: Dusan Stulik.

Detail of Mutitjulu Anangu rock art, Uluru, Australia. Photo: © Cliff Ogleby.

Village of Wadi Do'an, Al Gorha, Yemen. Photo: © Pamela Jerome.

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Locations of the illustrated examples.

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The Getty Conservation Institute works internationally to advance conservation practice in the visual arts–broadly interpreted to include objects, collections, architecture, and sites. The Institute serves the conservation community through scientific research, education and training, model field projects, and the dissemination of the results of both its own work and the work of others in the field. In all its endeavors, the GCI focuses on the creation and delivery of knowledge that will benefit the professionals and organizations responsible for the conservation of the world's cultural heritage.

For further information on the RecorDIM Initiative, visit the Getty Web site at www.getty.edu/conservation/field_projects/recordim/index.html

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Foreword

Conservation of cultural heritage requires a critical understanding of the significance, condition, and complexity of a place. Documentation is an essential element in building this understanding. It is a critical component of the conservation planning process and provides a long-term foundation for the monitoring, maintenance, and management of a site. Equally important, good documentation ensures that knowledge of heritage places will be passed on to future generations.

In 2002, the Getty Conservation Institute (GCI) hosted a group of international experts to explore ways of strengthening the documentation component of built heritage conservation. This group–working together as the Recording, Documentation, and Information Management (RecorDIM) Initiative–identified a series of priorities that could benefit the professional community responsible for conserving important heritage places. Among these priorities was the need for a publication that would provide practical hands-on approaches to assist conservation professionals in the design and implementation of documentation strategies. *Recording, Documentation, and Information Management for the Conservation of Heritage Places: Illustrated Examples* is the result.

This volume contains a series of illustrated case studies that demonstrates the successful use of diverse approaches to recording and documentation in a variety of situations. The examples cover a wide range of site typologies from individual buildings to cultural landscapes, and run the gamut of documentation techniques from hand survey to laser scanning. In each case, the approach to documentation is based, first and foremost, on the conservation needs of the site and the context in which the work takes place; technology, tools, and high-tech gadgets are secondary considerations.

For their work on this project, I extend my thanks in particular to Rand Eppich, editor and senior project manager; François LeBlanc, head of field projects (2001–2007); and the entire GCI project team. I am also grateful to all of the contributors, who generously gave of their time and shared their professional experience to help make this publication possible.

It is our hope that this publication and its companion volume, *Guiding Principles,* will serve as valuable tools for those who conserve and safeguard our cultural heritage.

Timothy P. Whalen
Director
The Getty Conservation Institute

Preface

Good conservation of our cultural heritage is based on informed decisions. The information needed to make these decisions is, in part, obtained through the use of documentation and recording tools. Knowledge of these tools and their use is readily available; however, many of the decision makers are unaware, uninformed, or unconvinced of their benefits. Several reasons for this include a misunderstanding of the tools and techniques or intimidation by the technology or language.

This has long been an issue in the field of conservation. To address the knowledge gap, this volume, *Recording, Documentation, and Information Management for the Conservation of Heritage Places: Illustrated Examples,* highlights a wide variety of projects, tools, and techniques through case studies that demonstrate how conservation decisions were reached through the appropriate use of documentation. The publication has been designed and written with the midcareer architect, conservator, or site manager in mind—those who make decisions, work in the field, and need to identify and select documentation tools. It is a nontechnical book, and each concise example can be read by these busy professionals within thirty minutes.

This collection of examples balances technology, geography, and site significance. Our methodology was simple: conduct an extensive and rigorous literature review to select examples that represent best practices for heritage documentation and recording. The layout and numerous graphics were carefully considered to allow professionals to quickly draw parallels to their own projects.

In recognizing that users of this book are interested in solving a pressing problem and are in need of a tool to assist them, each of the eighteen examples addresses the conservation issue first, not the documentation tool. This is followed by a description of the site and project, then a presentation of the tool and its use. Finally, an answer statement, final product, and summary are provided.

A variety of tools ranging in complexity are featured in this publication. After the introduction, the first three sections are organized following the method of the conservation process, whereby information is first gathered, then processed, and finally analyzed. A fourth section covers nontraditional recording tools that have been found useful in addressing a conservation issue.

It is important to note that many of these projects use a number of tools; however, we have chosen to limit our focus to the main tool or technique that assisted in reaching the conservation decision. Although each tool or technique illustrates a specific step of the conservation process, it may be suitable for other stages as well. Appendix A proposes teaching strategies for using these examples to discuss conservation issues and tool selection. A second appendix, appendix B, includes a list of heritage institutions and professional societies, as well as a list of equipment manufacturers.

Our wish is that this collection of examples from around the world will serve as a beginning reference guide to the conservation community. Presenting information as succinctly as possible was our goal throughout the entire process of compiling this publication.

First, we brainstormed conservation issues that recur in the fields of architectural conservation, architectural finishes, structural conservation, conservation planning, archaeological conservation, and landscape preservation. We paired these issues with the tools or methods traditionally used to provide an answer.

We then compiled an extensive and comprehensive bibliography focusing on applied documentation in the field of conservation. We researched and collected more than eight hundred sources from books, conference proceedings, journals, and reports found by searching various conservation-based library catalogues and databases. We considered sources brought to our attention by colleagues in the field, and reviewed recently published periodicals and books. In addition, our team attended various conferences focusing on cultural heritage to learn firsthand of new material and receive references from practicing professionals. A selected bibliography from this work, titled RecorDIM Initiative, is available in the Project Bibliographies section on the Getty Web site at www.gcibibs.getty.edu/asp/.

To guide the selection of contributors for this publication, we created a rigorous evaluation system. The collected source material was then distributed among team members, who systematically reviewed and rated the material against the following criteria:

- Is the conservation issue clearly stated?
- What is the scope of the conservation issue?
- Is there a correlation between the documentation phase and the conservation process?
- Are the documentation tools appropriate to address the issue in terms of cost, detail, precision, time, and availability?
- Are the tools effective?
- Is the writing style clear?

The ratings for each source were compiled into a matrix. Based on the results obtained, our team assessed and discussed the highest-ranking material before making the final contributor selection. In addition to the ranking, we sought to balance the techniques, technology, and geographic distribution of published projects.

From this matrix and our discussions, we obtained a list of potential contributors. We contacted each author and discussed our project, goals, audience, and methodology. The authors wrote about their projects, emphasizing a specific conservation issue, and the team worked with the authors to edit their materials for publication. In devising this systematic methodology to facilitate the collection and methodical review of sources, we believe we created an approach that can be applied to future editions of this publication, if undertaken.

We hope that the *Illustrated Examples* will assist conservators in selecting the appropriate documentation tools for their projects, and that it will serve as an introduction to new tools for the practicing professional, as well as for those studying conservation.

Rand Eppich, *Editor*

Amel Chabbi, *Associate Editor*

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Recording, Documentation, and Information Management for the Conservation of Heritage Places: Illustrated Examples is the result of the efforts and enthusiasm of many individuals and institutions. Foremost, we thank Robin Letellier for his leadership and efforts in forming the RecorDIM Initiative and heralding the cause of bringing together conservation and recording professionals. Sadly, Robin passed away during the editing process, but his legacy will continue through this publication. We also are extremely thankful to the members of the editorial board for their valuable advice and continued guidance during the creation of this publication: Alejandro Alva, Kate Clark, John Fidler, Frank Matero, and Giora Solar.

We also would like to thank Werner Schmid, contributor to the companion publication, *Guiding Principles*. We are deeply grateful to our colleagues from the International Committee for Documentation of Cultural Heritage (CIPA), Bill Blake from English Heritage, Mario Santana Quintero from Katholieke Universiteit Leuven, and Peter Waldhäusl, former CIPA president. John Burns from the U.S. National Park Service offered helpful suggestions that greatly improved this volume. Special thanks go to all of our contributors for their participation and collaboration.

We cannot forget our colleagues here at the Getty Conservation Institute: Tim Whalen, Jeanne Marie Teutonico, and Kathleen Gaines, for their direction and encouragement; Gail Ostergren, Jeffrey Levin, Cynthia Godlewski, and Angela Escobar, for their patient sharing of editorial expertise; and Claudia Cancino and the entire GCI staff, for their insightful comments on both form and content.

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INTRODUCTION

Informing Conservation

Kate Clark

It is easy to see the conservation of monuments, buildings, and sites as a purely technical exercise. All you need to do is diagnose the problem and identify the remedy. Unfortunately, heritage sites are not that simple. What makes something ultimately part of the heritage is not the fact that it is a building or even a ruin; instead, it is the value we place on it. We may value it because it is old, because of its association with a famous person or event, because it is beautiful or familiar, or because it tells a story. If it is value that makes something part of the heritage, then caring for the heritage involves caring for–or at least respecting–what makes it valuable. Values lie at the heart of all heritage management.

It is remarkably easy to damage what is important about a historic site or building. The wrong kind of mortar can accelerate the erosion of masonry; exposure and weathering can erode painted surfaces or soft mud brick; inappropriate cleaning can leave a surface more vulnerable than it was to begin with. Sometimes a site can be damaged by trying to do the right thing: a poorly placed visitor center or poorly designed access ramp can be detrimental to views and setting; overenthusiastic restoration can destroy important fabric; repairing a historic roof may inadvertently affect bat roosts; new services may plow through important buried remains. Although it is important to get the right technical solution for conservation, it is just as important to make sure that your conservation strategy is appropriate in terms of the value of the site.

In order to know why a building or site is valuable, we need to understand it first, and this is neither easy nor straightforward. You can understand what is important by talking to people in the local communities and experts; you can also understand what is important by looking at historical sources, maps and images, and literature. But you also need to look at the site. Historic sites, buildings, and monuments contain within them a story. It is the story of how they were constructed, used, and altered over time. It is a story that may not ever have been put down in writing. Sites will tell you how people lived and what they achieved; they tell of disasters and successes, innovation and conservatism. A building will tell you about the ambitions of the people who lived in it, their successes, and some of their failures; the fabric of a city or town will tell you stories of whole communities. Even a landscape contains a story–in the plants and wildlife that survive today, in the boundaries and the way water is managed, in the aboveground and buried remains.

Understanding the physical fabric of a site is an important first step in finding the right conservation strategy, and documentation is the first step in understanding. Site records can take many forms and may range from high-level aerial photographs down to the most detailed microscopic analysis of paint traces. In between is a wide range of other techniques: photographs, video, sketches, maps, and databases. You can work by hand or with the most sophisticated electronic or remote sensing equipment. In addition to images and representations, a variety of other information can be captured in written form. There are many different ways of documenting a site for conservation–the challenge is to decide which to use!

Kate Clark is founder of Kate Clark Associates, heritage consultants for the historic environment. Kate Clark Associates is involved with issues of heritage training, policy, research, and evaluation, as well as conservation management planning and community engagement in heritage. She is former deputy director of policy and research at the Heritage Lottery Fund. As an archaeologist, she has worked for English Heritage, the Ironbridge Gorge Museum, the University of Birmingham, and the Council for British Archaeology. She is the author of *Informed Conservation: Understanding Historic Buildings and Their Landscapes for Conservation.*

Tools Overview

Ross Dallas

Documentation for cultural heritage has become a much more complex procedure than it used to be. In the past, an architect or architectural draftsperson went to the building that was to be measured. Cloth tapes were slung about and *squareness, assumed horizontals,* and *verticals* were relied on. Perhaps the odd check diagonal was taken. Back at the office, on a sheet of paper, a drawing was drafted in pencil, then ruled in ink.

Times have changed, not only in the methodologies available but also in the perception of what is required and who will provide it. In recent years, a greater appreciation for these procedures seems to have developed, partly in relation to technical developments and partly through raised standards in the conservation field. The definition of *documentation* itself has become much wider: it can encompass everything from the simplest photographic snapshot to the most sophisticated laser scan survey. We should also recognize that the computer has revolutionized the way measured survey methods have developed in the last thirty years, not only in the computer that sits on our desk but also in the embedded microchip–a computer in miniature–that powers, for example, the total station theodolite.

This article, is taken from the author's "Measured Surveys of Historic Buildings: User Requirements and Technical Progress," which appeared in the Journal of Architectural Conservation, *vol. 9, no. 2.*

This introductory overview presents tools and techniques, many of which are illustrated in the examples throughout this volume. The following categorization of survey methods was devised by the author some years ago and generally has stood the test of time. As with all categorizations, it is a little simplistic, as tools and techniques are often combined. Nevertheless, it provides a framework to describe each technique in turn.

Base Recording and Condition Assessment: Manual Survey Techniques

Base recording is a term often used for the gathering of measurements and data to create a document, drawing, or photograph that will be used to make future conservation decisions. This base record will be added to as conservators, engineers, or architects work with the monument or site. The first technique is the oldest and most basic: hand survey.

Hand Survey

Hand survey is defined as the process of measurement of architectural detail where physical contact is made with the feature being measured.

For example, to measure a window, a surveyor most likely will use a tape measure or measuring rod, holding it against each feature and writing down the measurement on a sketch. Right-angle square or diagonal measurements are introduced to ensure accuracy at right angles, and a plumb bob or level is used to check verticality. There are projects where hand survey is the most appropriate technique, and projects where it is a necessary adjunct to other methods of survey. Hand survey remains vital because it is usually a very rapid method requiring few tools and minimal training, and often provides sufficient information with which to carry out conservation. Hand survey also helps architects or conservators become intimately familiar with an object by allowing the discovery of subtle aspects. In discussing hand survey, it should be made clear that high-quality workmanship is necessary to produce accurate drawings. The tools required may seem simple, but a well-done hand survey, efficient and accurate, is highly skilled work.

Generally speaking, hand survey is best suited to small areas. In large areas it becomes very difficult to maintain accuracies and can become too labor intensive. For example, a single bay of a typical church can be measured with good accuracy. If that accuracy is extended across the whole church, using the same methods of diagonal checks and triangulation, the survey most likely will drift out of accuracy. It is also difficult to maintain accuracy when measuring high or vertical elements from ladders or scaffolding. Today, the data collected from hand survey most likely will be transcribed directly to computer as a Computer-Aided Design and Drafting (CAD) file.

Sketch Diagram

This is defined as a drawing, often assuming squareness of horizontals and verticals, of a historic structure or site. Only a few measurements are taken, possibly just two or three of the width or length, with a few diagonal checks. Details such as windows are sketched in without measurement, and wall thickness would be assessed by the most rudimentary measurement through door openings. This method is usually assisted by photography. Sometimes sketch diagrams may be the only realistic way of obtaining any form of measured drawing, but users need to be aware of the limitations and advantages of such surveys. Sketch diagrams, especially in the computer era, have a habit of being drawn or transcribed until they become accepted as accurate. Such drawings will always be needed in times of rapid assessment, but they should be clearly labeled, and the temptation to refer to them as accurate must be firmly resisted.

Instrument Survey Tools

Years ago, instruments were introduced to improve the accuracy of drawings, primarily for mapping or topographic surveys. Instrument survey is a technique whereby the results and accuracy rely on measurement with a mechanical device and without direct contact with the object being surveyed. The principal survey instrument is the theodolite. While modern theodolites look quite similar to the older models, their operation and development have been transformed by electronics.

Total Station Theodolite

A theodolite measures vertical and horizontal angles. Using basic trigonometry, when angles and distances are known, positions or coordinates are calculated. This method was used for generations, but not without some faults. Essentially, the techniques were slow and highly error prone. Every reading had to be written down manually, then calculated in longhand and laboriously hand drafted.

The first great improvement came with the electronic theodolite. Manual recording of horizontal and vertical angles was replaced with electronic reading and recording devices. The theodolite was used just as before, but at the touch of a button the readings and measurements were automatically recorded and stored in digital form.

Concurrent with the invention of the electronic theodolite, methods of electronic distance measurement (EDM) were also developed. In simple terms, an infrared wavelength is transmitted to a prism or target or to the object (prismless), and the time it takes for the light to bounce back is measured (because the speed of light is known) and hence distance is calculated. The benefits are speed and reliability, and measurements can be made over longer distances.

By combining the electronic theodolite with EDM, the total station theodolite was developed. This instrument has become the workhorse of modern surveying. It is valuable in creating building floor plans and site surveys, though it still requires the use of a prism reflector or target and usually two operators. The next development was the reflectorless EDM (REDM) total station theodolite. This improvement has hugely enhanced the usefulness of the theodolite for elevation surveys, as it can take distance measurements straight from a surface without a reflector and requires only one setup, or operator. For surveying a fairly simple facade it is an ideal tool, offering accuracy, speed, economy, and simplicity of operation.

Laser Scanning

At first sight, the latest manifestation of instrumentation survey may seem to have little to do with the examples previously mentioned. In actuality, the "time of flight" laser scanner directly evolved from the total station theodolite and EDM. This type of laser scanner works by sending out thousands of pulses of light per second and, at great speed, calculates the three-dimensional coordinates of points, thereby defining a surface. It is essentially carrying out a task very similar to that of a reflector-less total station theodolite, only automatically at high speed. Horizontal and vertical angles are being measured, REDMs are being made, and the data are converted into coordinates.

Two other types of laser scanners work on entirely different principles: phase comparison and triangulation. In phase comparison laser scanners, the instrument emits light with a known frequency and phase and compares the emitted phases to the returned phases; thus the distance to the object can be determined. With triangulation laser scanners, a light emitter and a receiver are separated by a known distance, and the angle of the reflected laser pulse is used to determine the distance.

The rapidity of data capture and the instant ability to input this to the computer have made laser scanners an accepted tool in the field of survey. At the present time, they are used for everything from buildings and bridges to tunnel designs, objects, and topography, and provide a unique way of recording surface details. The only serious limitations are cost and the overwhelming amount of data collected. Currently, both the hardware and software are expensive, and the sheer amount of data gathered makes this tool not the best for every survey.

Global Positioning System (GPS)

The GPS method of locating positions on the Earth's surface through radio signals emitted from orbiting satellites, and sometimes ground-based transmitters, has been applied in many fields. It has been particularly valuable in the area of land surveying and in surveying large, complex archaeological sites. At first sight, the system seems to have little to do with conventional survey, but in fact GPS follows a traditional method of survey or, more strictly, a principle of trigonometry: If the lengths of the three sides of a triangle are known, the angles in between can be calculated. This means that if two corners of the triangle are fixed or located, the position of the third can be calculated. The satellites provide the known points and intersections for at least three satellites.

There are two general categories of GPS radio receivers: consumer handheld units, which range in accuracy from 5 to 15 meters (and have contributed to the widespread use of GPS), and more professional or survey-grade units. From professional instruments, astonishing accuracies are possible down to ± 10 to 20 millimeters. This means that site surveys and external building profiles can be surveyed directly with GPS instrumentation rather than having to set up theodolites and make conventional measurements. A ground-based system using the same triangulation principles as GPS can also be used for surveying, but with transmitter base stations set up locally–that is, without the use of satellites.

Image-Based Documentation Methods

The value of the photograph in all conservation work is inestimable, whether represented by today's ongoing site-record photographs or early photographs consulted for historic information (it is often forgotten that photographic technology is now more than 150 years old). Image-based documentation can generally be classified into three types: pictorial imagery, rectified photography, and photogrammetry.

Pictorial Imagery

Pictorial imagery constitutes the bulk of standard or ordinary photographs taken in conservation, usually with the camera oblique to the subject and utilizing any of a wide range of everyday cameras, from auto-focus to professional models.

Although it is a primary form of documentation, pictorial imagery is not generally meant to be used for measured survey purposes. Nevertheless, it can be used for measurement with two methods. Every conservation professional will, from time to time, take a photograph containing a scale against the object being photographed to gauge some dimension. This is a very useful method, but it must be treated with caution as accurate scaling on pictorial photographs is difficult to achieve. If at least two photographs of the same scene are available, a second method can be applied to pictorial photographs to provide a source of measurements. Technically, this process needs the services of a professional photogrammetrist, although with some of the computer programs available today, some measurements may be extracted by the photographer.

Video photography can also be considered as part of pictorial photography. An invaluable way of recording a great deal of information quickly, video not only records a building's features but can document its construction, use, and contextual significance as well. Video has the added advantage of simultaneously documenting images and audio commentary.

Rectified Photography

This is the first step up to a method that can provide reasonably accurate measurements from photography. Rectified photography is the process of photographing a facade by aligning the images to be as parallel as possible to the section of facade to be recorded. It includes the use of a relational scale so that dimensions can be measured. The resulting scaled print provides a reasonably true-to-scale image of the facade.

Whereas the photography part of the process is nowadays still quite straightforward, traditionally the printing and scaling were somewhat more complicated. With advances in computers, however, this latter process has become simpler. The photograph is now captured often obliquely to the facade and usually with a digital camera. Through the computer, in a fraction of the time it used to take, the digital image can be manipulated, a scale introduced, and tilts and distortion corrected. Rectification is done using a variety of software and can be a useful, rapid, and inexpensive form of documentation, particularly where the facade is made up of small components such as bricks, earth construction, or rubble walling. Although its main use is in recording flat building facades, it is often used for features such as floor surfaces, ceilings, and painted surfaces. If high accuracy is required–for example, to assess structural conditions–it is not appropriate. Rectified photography is generally provided by specialists, but it can also be done by conservators, depending on the standards required, availability of time, and resources.

Photogrammetry

Here the tools become more complex. As a source of measurement, photogrammetry still seems to be regarded as something of a novelty, yet it was first applied to building surveying as early as the 1870s. The modern use of photogrammetry for survey safely dates to the late 1930s through the 1950s and has since been in continuous use in many countries around the world. Photogrammetry is a much more complicated process than any other type of photography. It is the science of obtaining detailed measurements from photographs, often for the purpose of creating drawings, and encompasses both stereophotogrammetry and orthophotography.

Stereophotogrammetry involves taking stereo-pair photographs with calibrated cameras, then using the resulting images in a photogrammetric plotting device or computer to extract accurate measurements with which to produce drawings. This method is most appropriate in situations where a high level of detail or a great deal of irregularity needs to be recorded.

Orthophotography is a true-to-scale process that combines the benefits of a photograph with its wealth of detailed information and the geometric measurement accuracy of a survey with instruments. This is a complicated process that actually builds on using stereo-pairs of photographs. Very simply, a stereo-pair is captured and an entire series of corrections is made to the positions of identical points in the two photographic images. The result is a true-to-scale photographic image, or orthophotograph. With computerization, this process has become easier, faster, of better quality, and much more inexpensive. It is suitable for the representation of some types of features, such as drums or circular towers, and is also effective in representing irregular or complex facades.

In relation to the quality and quantity of data provided, photogrammetry usually is not expensive; however, a trained professional and special equipment are required. If only simple building outlines are needed, it is unlikely that photogrammetry will be economically justified, but for the highest-quality drawings of major facades, showing all stonework jointing and much architectural detail, photogrammetry remains an important tool.

Data Management

All the methods mentioned above will provide surveys adequate for most conservation work. After being collected, the data must be managed, an increasing role for both conservators and surveyors involved in documentation and conservation. In the following section, related data management techniques are introduced. As with data collection techniques, they may be stand-alone or used in various combinations.

Computer-Aided Design and Drafting (CAD)

CAD for the preparation and subsequent presentation of survey data has become an increasingly important tool in documentation. A CAD program allows the spatial data or drawings–which have been captured from many different sources–to be displayed, edited, and presented on a computer. CAD enables users to view drawings, zoom in and out, add and delete information, prepare specifications, print, and transmit information over the Internet. It is an immensely powerful tool now used in almost all aspects of documentation. Most of the illustrated examples in this book utilize CAD in some way in preparing data.

Computer Modeling

Computer modeling takes CAD a dimension further. Utilizing the capabilities of three-dimensional modeling, the survey and image data for a historic structure can be viewed on screen. The model can be scaled, rotated, and viewed in various ways. This enables a conservation team to assess the effect of likely alterations to a historic building or site.

Databases

A database is a collection of data, usually text, which is separated and systematically stored in tables with key identifiers. Records are often separated into sets, themes, and fields that allow for easy retrieval and "recombination," or queries of data. Databases can be as simple as a few lines of data to keep track of the windows in a small historic building, or as complex as multiple tables for keeping an inventory of all the historic buildings in a region. Other types of data such as images, drawings, measurements, and videos are now stored in multimedia databases. A database can be useful in conservation, not only to keep track of surveys and drawings but also to inform the public or organize and plan a conservation project.

Geographic Information System (GIS)

The concept behind GIS is quite simple, whereas its application can be very complex. GIS is similar to CAD in that it displays graphic information, and similar to databases in that it contains tabular data. The advantage of GIS is that it combines both CAD and databases. Information about a subject can be classified in two ways: first, the position or the spatial location (drawing) of a feature, and second, the descriptive information (text or other form). If these two classes of information are brought together with a computer program, then a GIS has been created.

A floor plan of a historic building provides a simple example. To each room in the plan, a set of attributes such as size, function, and features can be ascribed in a text format. This plan can then be combined with the text attributes in a GIS. With one click on the electronic drawing, the attributes can be displayed or the database searched, and the appropriate portion of the drawing displayed. This is useful in managing data for complex or large sites with numerous features or elements; however, its usefulness is questionable for smaller sites or single structures.

A wide range of tools for documentation are available, and all professionals involved with conservation should know their advantages and disadvantages. Architects certainly will be involved, but engineers, archaeologists, and conservators must also be informed and concerned regarding the processes of documentation. As mentioned earlier, others not directly involved with conservation, such as land surveyors or professional photographers, may carry out surveys, and it is important for conservators to understand the tools and processes involved in order to communicate effectively and obtain the best results. In addition, the role of the amateur should not be forgotten—in many countries, and for many years, invaluable work has been done by volunteers and students.

Thus, the documentation of our cultural heritage of historic buildings, structures, and sites is a vital and ongoing process. Though not a new activity in the last half century, the importance and value of documentation has been increasingly recognized within the conservation community. The value of good documentation assists informed decision making and ongoing maintenance for conservation. The wide range of examples in this publication illustrate the many methods and standards that can assist the conservation professional in choosing and applying the most appropriate technique or tool in any given circumstance.

Ross Dallas, BSc, FRICS, is a retired measured survey consultant who spent several years as chief surveyor for English Heritage. With a degree from Glasgow University and a background in land surveying and photogrammetry, he has spent his career in the field of surveying and recording historic structures. He has been elected an honorary lifetime member of CIPA Heritage Documentation (International Committee for Architectural Photogrammetry).